THE MEASUREMENT OF INDIVIDUAL DIFFERENCES IN PERCEIVED PERSONALITY TRAIT RELATIONSHIPS AND THEIR RELATION TO CERTAIN DETERMINANTS

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Project on Techniques for Investigation of Structure of Individual Differences in Psychological Phenomena
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Abstract

The trend in psychological investigations of interpersonal perception has been away from an emphasis on accuracy to an emphasis on the processes by which individuals form impressions of others. One approach has been to investigate the "implicit personality theories" of individuals. The present study was directed toward investigating (a) individual differences in perceived personality trait relationships, (b) the personality, ability, and sociological correlates or determinants of the different points of view held by the different types of individuals discovered, and (c) the structure of trait relationships for the different points of view.

For the measurement of perceived trait relationships, two forms of the Trait Similarity Rating Scale were constructed. Each form contained 300 non-overlapping pairs of trait-names of the total possible 1225 pairs of the fifty trait-names included in the study. Each pair was rated as to similarity-disimilarity on an eight-point rating scale. Additionally, scores on the following variables were obtained: Kuder Preference Record; School and College Ability Test (SCAT); a Biographical Data Sheet; a Personality Inventory containing Guilford's Cycloid Disposition, Rhathymia, Thinking Introversion, and Cooperativeness scales; the California F scale; a measure of Acquiescene Response Set; Budner's Tolerance-Intolerance of Ambiguity

Scale; Pettigrew's Category Width Scale; Edward's 39-item Social Desirability Scale; and an Interpersonal Rating Scale. The measuring instruments were administered to 262 individuals taking introductory psychology at the University of Illinois.

A type of factor analysis over individuals developed by Drs. S. J. Messick and L. R Tucker in 1960 was used to analyze individual differences in perceived personality trait relationships. In the analysis dimensions were obtained which represented different points of view concerning trait similarity, both individual and item coefficients were obtained for each dimension. The analysis was completed four times, once for each of two samples of fifty individuals on each form of the Trait Similarity Rating Scale. Three significant dimensions were obtained for each of the four analyses. Then, using a procedure developed by Dr. L. R Tucker, those dimensions were combined into three composite dimensions by transforming the dimensions in each analysis and summing over the analyses. The transformations for each analysis were defined in such a way that the reliabilities were .97, .94, and .87. The composite dimensions were then rotated orthogonally to positions which were meaningful, psychologically.

The meaning of the three composite dimensions or points of view resulted from a consideration of (a) the locations of individuals in the three dimensional space, (b) the determinants of the three points of view, and (c) the item coefficients for each of the three points of view. The results indicated that the major component in the trait similarity ratings was the second point of view which represented

a kind of "conventional" view of trait relationships. Departures from the second point of view were defined by the first point of view which was a response set to mark the rating scale toward the dissimilar or negative end and by the third point of view which was identified as a result of its correlations with the additional variables as an authoritarian point of view.

An analysis of the item coefficients for the second point of view resulted in the following factors which seemed to account for the conventional perception of similarity between personality traits: "social desirability," "mental potency," "emotionality," "stability," "sociability," "sophistication," and "greediness."

An examination of the item coefficients of the authoritarian point of view indicated that only a small nucleus of traits are perceived differently by the authoritarian. They were as follows: dishonest, weak, passive, submissive, rational, predictable, aggressive, irrational, unpredictable, domineering, defensive, and uninteresting. The particular shifts in meaning were related to the authoritarian syndrome and found to be compatible.

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Chapter I
INTRODUCTION

The Relation of Impression Formation to Social Perception

Social perception is one of the principal areas of concern to contempory social psychology. Social perception involves the processes whereby people perceive their human environment and the relation of these processes to interpersonal behavior. As such it stands at the very foundation of social psychology. However, for all its centrality, this area of investigation has not been directly and systematically attacked until fairly recently. This problem area has been variously labeled social perception, interpersonal perception, and person perception. The term social perception is probably least definite of all. As Tagiuri (1958) has pointed out, "social perception is used in at least two senses, referring, on the one hand, to the problem of the social determination of perception[1] and, on the other hand, to the problem of the perception of the social." This latter sense probably relates most directly to the interests of social psychology and involves broadly the perception of other persons, groups, and institutions. Because they are more explicit the terms person perception and interpersonal perception will be used when referring to the processes involved in the perception of another person or other persons. The term perception is used in a broad sense to include cognitions, inferences, and remembered stimuli, not necessarily present in sensation at the moment. In this connection Taft (1960) prefers the term person

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cognition because it frees us "to use the great body of material that has been accumulated on the cognition of objects . . . it implies a more active process of knowing than perception, and it enables us to embrace an inference model of how we know people." Heider (1958), on the other hand, suggests that perception has a broader meaning which subsumes the cognizing processes involved.

Also, Allport (1955) has presented a trenchant statement of some of the issues involved in the selection of terminology:

> As a first approximation, let us say that it [perception] has something to do with our awareness of the objects or conditions about us. It is dependent to a large extent upon the impressions these objects make upon our senses. It is the way things look to us, or the way they sound, feel, taste, or smell. But perception also involves, to some degree, an understanding awareness, a "meaning" or a "recognition" of these objects. . . . Thus, we can include all the senses and can interpret perception as covering the awareness of complex environmental situations as well as of single objects. Though some psychologists tend to assign this last consideration to cognition rather than to perception the two processes are so closely intertwined that it would scarcely be feasible, especially from the standpoint of theory, to consider one of them in isolation from the other. (p. 14.).

For the present purposes, the terms person perception and interpersonal perception shall be used to designate all the different ways we have of getting to know others, from direct perception to explicit inference.

Burner and Tagiuri (1954) have produced a discerning integration of representational studies in the area of person perception and have grouped the studies into three categrories: (a) the recognition of emotions in others, (b) the accuracy of appraisals of other

personalities, and (c) the process by which personality impressions are formed. They conclude that the current trend in research

> . . .appears to be in the direction of investigating what kinds of organized impressions are formed under varying conditions of cue, role, set, and prior information. There appears to be a deemphasis of interest in the nature of judgmental accuracy, and a renewed emphasis of interest in the judging process. . . (1954, p. 648.)

Tagiuri (1960) has subsequently stated some of the reasons for this shift in emphasis.

> If we look at the psychological literature that has explicitly addressed itself to the problem of person perception, we find that, especially in the United States, the bulk of it is concerned with the problem of accuracy. Psychologists working in this area turned to quantification prematurely. In so doing they were caught in a veritable jungle of artifacts. . . (1960, p. 176.)

The Elements of Impression Formation

An analysis of the processes involved in forming impressions of others leads to a consideration of several factors: (a) the circumstances under which the impression is made, (b) the type of data available to the perceiver, (c) the characteristics of the perceiver, (d) the characteristics of the object person, and (e) the type of judgment called for. From the above, three major elements are distinguishable, and they can be stated in the form of a paradigm as follows: an observer, judge, or perceiver (p) forms an impression of a stimulus person or object person (o) in a particular situation (s). Each element makes a very definite contribution to the resultant impression formed. A perceiver does not have to know much about a

person to know how he feels after the loss of a loved one. And quite apart from the situational cues a perceiver can soon perceive the relative pleasantness of an individual. Furthermore, given the complexity and ambiguity of persons and situations, the perceiver can and does introject a source of variation into the system. Some persons see others as being relatively friendly while other individuals perceive the whole world through a jaundiced eye.

Qualities, Determinants, and Consequences of Impression Formation

In order to understand the goals involved in investigating impression formation, Hastorf, Richardson, and Dornbusch (1958) identify three primary and interrelated aspects of the process. It is through their analysis that an understanding of impression formation may be gained. The three primary aspects are as follows:

> 1. What are the qualities of experience in social perception? We are interested here in the experiences one has of other people in social situations which are reflected in the verbal categories one employs in talking about other people.
> 2. What are the determinants of these specific experiences? We use determinants in the sense of correlates of these experiences in terms of the variables of social psychology, for example, status, occupation, or certain facets of individual personality.
> 3. What are the consequences of a specific perception? . . .the consequences of these experiences for other types of behavior. (1958, p. 55.)

In other words, we should be interested in specifying (a) the content of impressions formed by a particular p of a particular o in a particular s, (b) the general processes by which p makes inferences, (c) the perceiver attributes leading to individual

differences in the inferences that p's make, and (d) the relevance or consequences of the resultant impressions for other aspects of interpersonal behavior. That is, when we form an impression of others, we refer mostly to observations about their intentions, attitudes, purposes, and traits. Principal among these are the person's traits, and many of the other attributes are often reduced to traits. We say that a person is friendly, fearful, boastful, hesitant, aggressive, etc.

Qualities of Impressions and Their Relations--Trait Inference

Basically, a person can be described, as a physical stimulus, strictly in terms of physical attributes, organized spatially and temporally. However, our initial formulations of another person are consistently of a psychological nature and are inferred from the mass of physical attributes that are presented. Furthermore, we receive information relative to only a limited number of personality characteristics. And since our behavior in social situations is governed to a large extent by our perceptions of the other person, it is necessary to rely on an ability to extrapolate from available information to other unknown aspects of the other person. Suppose that we are informed or perceive directly a given trait or group of traits. We infer from the information or perception what additional traits he may have. And it is likely that we do so in some characteristic way.

A person must have some relatively stable scheme of expectations

and anticipations about others which is gradually built up through experience and through which the experienced qualities of a particular person are derived. This scheme may be thought of as the set of inferential relationships among experienced attributes and traits which exist for an individual. This set of expected relations among traits constitutes what has been variously called an individual's "implicit theory of personality," his "lay conception of personality," his "personality space," his "layman's psychodynamics," or his "naive psychology." (Bruner, Shapiro, & Tagiuri, 1958; Bruner & Tagiuri, 1954; Cronbach, 1955, 1958; Hastorf, Richardson, & Dornbusch, 1958; Hays, 1958; Heider, 1958.)

Thus, we may be informed that a person is generous and infer that he is also thoughtful. One the other hand his generosity may tell us little about his honesty. Undoubtedly, differences in the structure of this implicit personality theory exist within a particular culture and probably to an even greater extent between cultures. For example, to some people intelligence may suggest warmth and wit. But to other people intelligence may be associated with sarcasm and coldness.

A large body of literature exists on the judgment of facial expressions. The line of experimentation probably began with a study by Boring and Tichener (1923). They prepared a number of interchangeable features and compounded them into 360 profile drawings of the human face. Interestingly, perceivers had no difficulty in seeing the units as conveying intelligible expressions. Subsequent

experiments have been conducted by Schlosberg's students and others. For a review of relevant articles in this area up to 1954 see Woodworth and Schlosberg (1954). The details relating to studies of facial expression are not closely related to the present study and will not be considered in any further detail.

Determinants of Particular Qualities of Impressions

Secord (1958) has investigated the general and ideosyncratic inference processes in impression formation based upon facial features. It is informative to report the determinants that are relevant for the type of situation that he used. The following five kinds of inference processes were presented:

> 1. Temporal extension. The perceiver regards a momentary characteristic of the person as if it were an enduring attribute.
> 2. Parataxis. The perceiver generalizes from a previous interpersonal situation with a significant other to an interpersonal situation with a new object person.
> 3. Categorization. The perceiver uses cues to place the object person in a category, which is associated with certain personality attributes.
> 4. Functional inference. The perceiver infers that some aspect of the object person functions in a particular manner; from this he assumes that the individual possesses an associated attribute.
> 5. Metaphorical generalization. The perceiver makes an abstract generalization based upon an analogy between some denotable characteristic of the object person and a personality attribute. (1958, pp. 313-314.)

These represent general determinants of the inferential process occuring when the perceiver is required to make inferences or form an impression in an impoverished situation such as in facial perception. Those determinants that account for individual differences are given

as (a) deviant position on a cultural stereotype, (b) various kinds of parataxic distortions, (c) use of categories based upon cues having personal significance to the perceiver, (d) the more general cognitive attitudes or means of schematizing which the perceiver utilizes. Also relevant are various kinds of motivational determinants, two of which were described as projection (the attribution of one's characteristics, traits, or motives to another person in order to avoid recognizing them in oneself) and autistic perception (distorting the object person in the direction of a desired end). Conspicuously absent from Secord's account is a consideration of those numerous other personality, background, and sociological determinants suggested by Hastorf, Richardson, and Dornbusch (1958). Besides cognitive style or attitude and unconscious motives, a person's interests, intelligence, personality, and family background are a few of the many determinants that probably affect the type of inferences made. Certainly, the possible contribution of a number of widely differing personality and sociological variables to the process of making trait inferences needs to be investigated.

Individual Differences in Trait Inferences

While there has been considerable evolution toward a more desirable and complex treatment of an individual's perceptual structure or "perceptual space," there has been virtually no concern for the investigation of the "role of individual differences" in these phenomena. Addressing themselves to the nature of most previous inquiries into the nature of perceptual structures of individuals, Tucker and Messick (1960) point out that two alternative procedures

have been employed in dealing with groups of individuals, first, "to develop results for the average person in each group," and second, "to work with each person separately." Several limitations of these two methods are discussed. The first "may lead to an easy but possibly false interpretation of taking . . . the average person to describe . . . each individual." And the second requires extensive observations to obtain stable individual results, and it leads to difficulty in describing results for groups of individuals and in comparing several individuals and groups. Tucker and Messick discuss a particularly relevant problem with the first procedure in that "when comparisons have been attempted between perceptual structures for several groups having presumably diverse orientations to the stimuli, a common experience has been that only subtle differences in these structures have been observed. . ." (cf. Abelson, 1955; Messick, 1956b, 1960a.) "It may be that there are extensive differences between individuals as to perceptual structure but that we have not yet discovered how to sort people into contrasting groups which would have different perceptual structures for their average persons." (1960, pp.1-2.)

Tucker and Messick (1960) then develop a procedure designed to yield "types" of perceptual spaces or "different points of view about stimulus similarity." In the method a matrix consisting of similarity measures for pairs of stimuli for different individuals is subjected to a type of factor analysis based on a procedure developed by Eckart and Young (1936). The analysis yields dimensions

of variety among the individuals and also measures of similarity for pairs of stimuli for "idealized individuals" which represent the dimensions obtained in the factor analysis.

A preliminary experiment has been conducted utilizing the above procedures (Messick, 1960a; Tucker & Messick, 1960). An analysis of judged similarity in political thinking was performed for four types of individuals: liberal Democrats in favor of labor; conservative Democrats in favor of management; liberal Republicans in favor of labor; and conservative Republicans in favor of management. The stimuli consisted of all possible pairs of a list of 20 prominant political figures.

It was found that three dimensions accounted for most of the individual differences. And all individuals had large, positive values on the first dimension that were approximately equal. In terms of the remaining two dimensions, there seemed to be three idealized individuals, (A, B, and C), represented at the intersections of the three lines of a triangle which seemed to include the entire group of points in the plot of factor II with factor III. A transformation matrix, T, was determined which provided coefficients for the individuals and for the stimulus pairs in terms of the idealized individuals. Further analysis of the coefficients for the idealized individuals indicated differences in complexity between them. The method appears to be extremely suitable for the analysis of individual differences in the perceived relationships between traits.

Another experiment employing the procedures suggested by Tucker and Messick (1960) has been reported in a recent article by Triandis and Triandis (1962). They were interested in determining the factors that underlie the social distance responses of high and low social distance subjects from both the Greek and American cultures. Three significant factors were obtained--"evaluative," "race," and "religion." A three-dimensional plot of the stimuli used in the social distance questionnaire was made in terms of their obtained coefficients on the three factors. All white, same religion stimuli were located in the same area of the factor space and were very close to the observer. All white, different religion stimuli were clustered together in a different area of the space resulting from differences on the religion and evaluative factors. They were at a medium distance from the observer. All Negro stimuli were densely located in an area resulting from a shift in race and evaluative loadings. They were less well differentiated with respect to religion and were located far away from the observer.

The analysis also permitted an examination of the factor scores or individual coefficients on the three factors. The findings showed that the low social distance subjects for both cultures were low on the race and religion factors and high on evaluation. On the other hand, the Greek high social distance subjects were "only slightly high on the race factor but quite high on the religion factor." The American subjects were low on the religion factor and quite high on the race factor. These results are interesting in that

they point to "the basic differences of emphasis on race and religion in the two cultures."

Determinants of Individual Differences in Trait Inferences

Once having delineated certain individual differences in the structure of trait inferences, there remain two succeeding phases of interest: (a) investigations of some of the possible determinants of the obtained individual differences, viz., personality and sociological factors; and (b) an examination of the consequences of holding different viewpoints regarding trait relationships.[2] In much of the research on person perception an analysis of the characteristics of the perceiver is neglected and implicitly assigned to variance. Some recent exceptions to this tendency are the discussions of Cronbach (1958) and Taft (1955) wherein attention is directed to this important area. Because of limitations attached to the present research, investigations shall be carried through part (a) above. While it would be interesting to extend the study to encompass part (b), as well as to other topics to be discussed in subsequent chapters, the magnitude of doing so places it beyond the limitations of this research, and the investigator will have to be content to reserve them as topics for subsequent research.

A meager number of studies are reported in the literature which relate to the determinants of individual differences in person perception. The bulk of those will be reported in the next

[2]Closely related to these vested goals is the statement by Cronbach that ". . .theories of perceptual response should take into account the traits being perceived, the constant tendencies in this perceiver with respect to those traits, and finally the effect of the particular other as a social stimulus to this perceiver." (1958, pp. 375-376.)

chapter covering a "Review of the literature." However, to indicate the nature of the determinants investigated as well as their association with person perception, two studies will briefly be reported here.

Jones (1953) found, using the California F scale (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950), that low authoritarians are generally more sensitive than high authoritarians to variations in the psychological characteristics of the stimulus person and more inclined to pass judgment.

Another study demonstrating the relationship between the personality characteristics of the perceiver and the structure of trait relationships was conducted by Hill (1958). It was found that the centrality of a trait was determined not only by invariant characteristics of inferred trait relationships, but also by the personality characteristics of judges. Judges, who themselved scored high in sociability on the Gordon Personality Schedule, were prone to consider this trait as "central," while those who scored low on sociability did not consider it as "central."

A Statement of the Present Research Problem

The present research is directed toward the problem of relating individual differences in perceived personality trait relationships to certain personality and sociological determinants. The analytic procedure developed by Tucker and Messick (1960) will be utilized to determine types of structures associated with inferred trait relationships or idealized individuals relating to perceived

personality trait similarity.[3] The idealized individuals representing individual differences in perceived personality trait relationships will be related to a number of sociological, background, and personality determinants through correlational analyses. An effort will be made to span as extensively as possible the "personality space" relating to the description of individuals and to sample what appear on an a priori basis to be the more relevant sociological variables. The rationale for selection and the description of the various measuring devices employed are given in Chapter III, "The Measuring Instruments."

[3]In the foregoing discussion trait inference, trait implication, and trait similarity have been used as interchangeable expressions. Trait inference and trait implication are probably different sides of the same coin. However, there might be some argument as to their equality with trait similarity. Trait similarity represents a rating of the degree of similarity that two given stimuli have to each other, while trait implication and trait inference refer to the situation where only one stimulus is given and the probability that another stimulus will be inferred and the similarity of that inferred stimulus to the given stimulus is wanted. In other words, trait similarity describes a special case of trait inference, that is, when the probability that one trait will be inferred from the other is unity. Since the probability that one trait will be inferred from another is likely to be very closely related to the similarity between traits, they will be used somewhat interchangeably throughout the remainder of this paper.

Chapter II

REVIEW OF THE LITERATURE

Introduction to Review of the Literature

In the review that follows an attempt will be made to consider representative studies dealing with trait inference, individual differences in trait inference, and determinants of individual differences in trait inference in the area of impression formation. This means that studies concerning such stimuli as facial features will not be included. Rather the interest is in confining the coverage to include those studies where (a) the object person's characteristics are restricted as far as possible to the traits that he possesses and (b) the perceiver's task is to make direct inferences from the given traits or trait-names to other trait-names. The above restrictions focus as closely as the present literature permits on the existent knowledge concerning perceived or expected relations between trait-names.[4] Many of the studies will be quite peripheral to the present research, having only an indirect bearing upon it. However, it is felt that they will serve not only to embed this research in the stream of related research activities, but may lead to a more comprehensive view of this important research area.

Some time ago Allport (1937) noted that short exposure to a complex pattern of stimulation was capable of producing definite opinions in the observer and the process occurred very rapidly. He also indicated that in the judgment of personality, three factors were

[4]The scattered literature in this connection has been particularly sparce in theoretical contributions and has led Cronbach (1958) to comment on the general area of interpersonal perception that it is "interesting, statistically significant, and exasperatingly inconsistent."

operating: (a) the ability of the judge, (b) the trait being judged, and (c) the "open" character of the rater. Thus, Allport observed two important aspects of other person judgments, the stimulus characteristics and the intrapersonal processes.[5] The following studies will be organized around these two focal points.

Stimulus Characteristics

While early work in person perception was concerned with both aspects, perceiver and stimuli, they concentrated upon accuracy of judgment and its correlation with other measures obtained from the judges. A shift in emphasis to the perceptual nature of the other person judgments embodied in impression formation was started by Asch (1946, 1952). And so a discussion of trait inference in impression formation must logically begin with his pioneering efforts. Because of its importance intrinsically and in influencing subsequent research, it will be reported in some detail.

Some theoretical possibilites for describing the process of impression formation were presented and discussed which can be resolved into two basic types: "additive" and "dynamic." The additive type considers the total impression of the perceived person as the sum of several independent impressions. The dynamic type says that "we form an impression of the entire person," or ". . .we try to get at the root of the personality. This would imply that the traits are perceived in

[5]This is in agreement with the paradigm of person perception discussed in the "Introduction." A perceiver (p) observes, perceives, or judges an object person (o) in a particular situation (s). Hence, an understanding of the complete perceptual process involves an understanding of the intra-perceiver process and an understanding of the stimulus configuration presented by the object person and situation.

relation to each other in their proper place within the given personality.

To demonstrate the organized nature of impressions of personality and the inadequacy of the simple additive model, Asch performed a series of ten experiments. They were designed to show how such qualities as "warmth" and "intelligence" may have various meanings when embedded in different contexts or combinations of trait-names and how they in turn affect the total "impression" of the combination. They can be classified into the following categories as to experimental condition: (a) alteration of a trait series and how it affects the relative "centrality" of a trait, (b) alteration of the initial trait in a series and the primacy effect (the setting up of directional tonal qualities in the remaining traits in the series), (c) presentation without forewarning to the subjects of a second series of trait-names to be included in a "total impression" with an initial trait series to which the subjects had already completed an initial impression, (d) simplification of trait series, and (e) overlapping of trait-names from series to series and the similarity of the impressions formed.

The basic procedure consisted of presenting a series of trait-names "that belong to a particular person" (i.e., the "stimulus list") and requiring the subject to perform two tasks, (a) write a sketch of the "particular person," and then (b) select from a checklist of pairs of opposite traits the terms that best fitted the impression formed. One experiment, which has subsequently been called the "Warm - Cold Experiment" in various investigations, consisted of presenting to the subjects two stimulus lists, identical except that in the second

series "cold" was substituted for "warm." The result was that in the second list there was a radical change in the judgment of the other traits in the list. The fact that the changes were not uniformly evaluative for all traits was considered evidence for rejecting an "additive-type" model. In other words, "the given characteristics do not all have the same weight for the subject." It was also observed that "the weight of a given characteristic varies--within limits--from subject to subject."

Asch's general conclusions were "that characteristics are perceived in their dynamic relations; that central qualities are discovered, leading to the distinction between them and peripheral qualities; that relations of harmony and contradiction are observed." Of particular interest is his statement that "we have not dealt in this investigation with the role of individual differences, of which the most obvious would be the effect of the subject's own personal qualities on the nature of his impressions." (1946, p. 283.) Thus, a case is clearly made for the necessity of investigating individual differences in impression formation and the subject's personal characteristics as determinants of those individual differences. It is interesting that these would remain as some of the principal goals in person perception a little more than a decade later (cf. Hastorf, Richardson, & Dornbusch, 1958).

Another Gestaltist, Luchins (1948), has severely criticized Asch, asking how his procedure "fulfills the Gestalt principle of being guided in the construction of experimental design by the 'concrete

nature' of the things studied." The most important criticisms were that Asch's methods made no provision for the following: living, organized people, opportunity for interaction between "observer and observed, out of which grows an impression;" and the dynamic, changing time-space manifold in which the impression forms and grows.

It is further argued that "in the judgments of actual people the observer need not necessarily perceive diverse characteristics. His impression of a person may form before he is aware of distinct characteristics and need not be the result of organizing these." Furthermore, Luchins replicated one of Asch's experiments and reported that his "results differed sharply from those Asch found." (p. 321.)

In a general way Tagiuri (1960) has reacted to objections regarding the relevance of "simplified and dehumanized situations" to the study of person perception. He has stated that

> . . . the real issue is not one of relevance but of what the investigator does with the information he obtains. If he uses it as a source of insights which he tests as best he can on actual persons, or if he uses the simple situations to test hypotheses developed from observing real people, then, I think, the approach is both fruitful and sound. (1960, p. 192.)

Not only have other investigators substantiated Ash's results, but also experimental findings have supported the transition of his findings with fictitious persons to actual persons. Objecting to Asch's sampling procedures, particularly with respect to sex and geographical factors, Mensh and Wishner (1947) replicated two of Asch's experiments. In the first experiment, two lists of seven words identical with the exception that one list contained the

trait-name "warm" while the other list contained the trait-name "cold" were presented, respectively, to two groups. In the second experiment "warm" and "cold" were used in two other lists different from each other. The findings corroborated those of Asch in that central traits affect certain other traits, but not all; central traits may become peripheral and peripheral traits may become central, depending on the context; and the relative weights of the traits depend on their interaction.

Kelley (1950) employed the "warm-cold" procedure in an experiment where students were to rate a real instructor whom they met after they had been briefly informed as to what type of person he was. Half of the students were told, among other things, that he was warm, and the other half that he was cold. Kelley found substantially the same effect reported by Asch. And again there was no examination of differences that may have existed between individuals.

Bruner, Shapiro, and Tagiuri (1958) have also attempted to determine variables relevant to "lay personality theory." These investigators, in what might be considered an evaluation of Asch's (1946) "additive model," sought to determine the relation between inferences made from single traits in "isolation" and inferences made from the same traits in "combination." The procedure consisted of presenting one or more traits and asking the subject to draw inferences about other traits. It was found that where two (or two out of three) traits given singly point in the same inferential direction, the influence from the combination of two (or three) will point in the

same direction. Also, where two traits presented singly generate inferences to specific traits that are respectively, positive and negative, the combination of the two will show the same sign as the trait that in isolation led to the larger number of definite inferences in a given direction.

So in contrast to Asch's (1946) conclusions regarding the integration of trait information, that traits are "dynamically" related with considerable importance attached to the centrality of a trait, it was demonstrated that the meaning of traits in isolation is related to definite operations within a specified universe of inference that additively relate to the meaning of traits in combination. Asch's rejection of the possibilities of an additive model may have been premature. Moreover, if Bruner et al. had used a metric (beyond the mere indication of direction) and considered explicitly the dimensionality of trait relationships, it is likely that even clearer results would have been obtained.

A further indictment against the essential postulate of Asch's formulation, that the final impression is unpredictable from any prior knowledge of the denotative and connotative meaning of the elements of the stimulus list, individually or in interaction, is presented in a recent article by Wishner (1960). Viewing impression formation as concept formation, he states the problem of analysis and prediction as follows: "what effects do the amount and types of information supplied to S have on the concept formed?" He further states that in order to predict the effect "one would have to know

something about the relationships obtaining between the various items of information supplied to a subject as well as between those items and the matters about which concepts are to be formed." The study by Bruner, Shapior, and Tagiuri (1958) was seen to be inapplicable to Asch's situation because it asked "for abstract inferences about words rather than about specific persons" and because "their computational procedures yield results which may be peculiarly dependent on their particular sample."

Wishner assumes that the ratings made by the perceivers on the check list are dependent upon the intercorrelations between the individual trait-names in the stimulus list and the individual items in the check list. A number of studies are conducted and reported utilizing this approach. Some of the studies represent application of the procedures to the results reported by Asch (1946) and by Mensh and Wishner (1947), and other studies represent application to new stimulus lists and check lists designed to test the hypotheses more directly.

An analysis of Asch's "Warm-Cold" experiment showed that the large differences in check list ratings for the "Warm" and "Cold" groups can be predicted from the intercorrelations independently obtained between each trait to be rated and "Warm-Cold." "Warm-Cold" correlates most highly with those items in the check list which showed the greatest differences between "Warm" and "Cold" groups. Therefore, if one trait in the stimulus list is to be varied, and if it is relatively uncorrelated with the other traits in the stimulus list, as is true in the "Warm-

Cold" experiment, the effects of the variation will be a function of the correlation coefficients between that stimulus and the responses to be made. Conversely, it was shown that the items in the check list which changed relatively little as a function of "Warm-Cold" tend to be more highly related to the non "Warm-Cold" items in the stimulus list than those items which did change.

Similarly, large differences were obtained between stimulus groups when "Intelligent-Unintelligent" and "Blunt-Polite" were varied within the same stimulus context as used for "Warm-Cold." The hypothesis was supported in that different patterns were produced; check list items most highly correlated with the varied stimulus showed the greatest differences between groups. The results were the same irrespective of the ordinal position of the altered stimulus in the stimulus list, contrary to the Gestalt view and to Asch's findings. Therefore, it is conceivable that all items in a stimulus list could be "central" in Asch's sense by appropriate manipulations of the check list (in contrast with Asch's method which consists of varying the stimulus list). As would be expected under Wishner's assumptions, when the trait varied is correlated with the other items in the stimulus list, and when the other constant items in the stimulus list are correlated with the traits in the check list, rather complicated interactions occur.

The above two studies by Bruner, Shapiro, and Tagiuri (1958) and Wishner (1960) present results that are diametrically opposed to the conclusion that the formation of an impression is a function of

interactions which produce an organized, total impression. Their findings support an additive model of trait implication, in the sense that a formed impression is predictable from the trait-name elements from which it is formed.

Cofer and Dunn (1952) have conducted an experiment designed to determine the effects on impression formation when the initial stimulus is perceived as incidental or irrelevant by the perceiver. To disguise the nature of the experiment it was presented as an experiment in retroactive inhibition. Twelve words unrelated to personality traits were presented on a memory drum for serial learning. Two groups received identical lists with the exception that the fourth word was "warm" for one group and "cold" for the other. The interpolated task was the rating of twelve pictures of different men on eleven traits on a seven point scale. Four of the traits produced significant group differences--restrained for the "cold" group and humorous, humane, and altruistic for the "warm" group. The authors interpret their findings as evidence that the incidental occurance of words (eg., "warm" or "cold") make more available to the subjects attitudes that predispose them to be more or less favorable to the object persons. Obviously, not all the results reported by Asch (1946), Kelley (1950), and Mensh and Wishner (1947) can be explained in terms of those verbal processes alone because of the quite different conditions in their studies.

Kjeldergaard and Jenkins (1958) have "identified" and elaborated the model implicitly used by Cofer and Dunn (1952). They identify it as the "Representational Mediating Model," extensively elaborated

upon by Osgood (1953). However, they propose that an alternative model, "The Associative Chaining Model," "handles the data [of the Asch-type experiments] at least as well as the more complex mediation model." They performed two experiments: explicating the Cofer and Dunn experiment employing "more appropriate" statistical analysis and an alteration which represented a closer rapprochement to the Asch experiments. No significant effects were found in either. It appears that the perceiver must perceive a direct relevance of attributes to the object person being rated before those attributes can affect the nature of the ratings. However, more research needs to be done in this area.

Asch (1946) hypothesized that the first adjective in a series sets up a directed impression in terms of which the later adjectives are interpreted, that is, the initial impression acquires a certain stability. This was also shown by Dailey (1951) in a more complicated judging situation. After judges had first come to a personality formulation on the basis of a portion of the total information available and then reconsidered in the light of the entire material, the first impressions made the later material less effective.

Another experiment on the configural nature of impressions and their relative cohesiveness was performed by Asch (1952). Subjects were asked to form impressions from two trait lists: "intelligent-industrious-impulsive" and "critical-stubborn-envious." After they had formed impressions of two separate persons, they were instructed to regard all traits as characterizing a single individual. They had difficulty in doing so compared with subjects who, from the beginning,

were told that all terms referred to the same individual.

Kastenbaum (1951) found the same results using three telephone conversations--warm, neutral, cold.

Analogous results were found by Haire and Grunes (1950). They were interested in using the Asch-type technique to assess what the differences in the perception of two factory workers would be with and without the inclusion of the stimulus trait, union membership. Other traits included in the list were as follows: works in a factory, reads a newspaper, goes to movies, average height, cracks jokes, intelligent, strong, active. Also two additional lists, identical to the first except that intelligent was excluded, were constructed. The subjects were required to "describe in a paragraph what sort of person you think he is." While able to integrate the traits into a description of the factory worker who was neither "intelligent" or a "union member," the judges had difficulty in completing a uniform impression when "intelligent" was included. A content analysis revealed four types of major responses toward the conflicting stimuli: (1) denial of the stimulus; (2) modification of the stimulus by wrapping it up in another context or reinterpreting the stimulus so that it loses its conflict-producing characteristic; (3) allowing the stimulus to make a real change by (a) changing a dimension of the personality irrelevant to the worker-intelligent conflict, (b) modifying the interpretation of "worker" so that the stereotype that is in conflict with "intelligent" is not evoked, or (c) changing the basic picture of the worker; and (4) explicit recognition and maintenance of

the conflict.

As a further refinement in the investigation of factors affecting conflict resolution in impression formation, Pepitone and Hayden (1955) presented two degrees (strong and weak) of conflict by manipulating the stimulus person's group memberships. Four types of resolutions were identified: "instrumentalization"--membership in one of the conflicting groups was seen to be nominal; "elimination"--beliefs associated with the conflicting group were eliminated from the impression; "overlapping"--common characteristics between conflicting groups are emphasized; and "no solution"--the conflict is described but not resolved. The principal finding with regard to the strength of conflict were that (a) the majority of subjects under both conditions attempted resolution of the conflict; (b) significantly fewer individuals in the strong condition attempted a resolution; and (c) the direction of resolution for the strong condition was more equally distributed.

To eliminate the artificiality imposed by the utilization of trait-names, Gollin (1954) investigated the resolution of conflict by presenting a silent motion picture of a young woman depicting two behavioral themes--"promiscuity" and "kindness." His analysis of the conflictual themes disclosed three basic conflict-resolving responses. They were described as follows: "related"--retention of both themes and an attempt to account for both; "aggregated"--retention of both themes but with no attempt at relating them; and "simplified"--retention of only one of the two themes. The similarity between "simplified"

impressions and the "black-white" judgments of the individual who is intolerant of ambiguity, discussed by Frenkel-Brunswik (1949), led to the hypothesis that the "simplified" person would accept or reject the stimulus person in a more unqualified way than individuals forming more unified impressions.

Subjects responded to the stimulus presentation with a detailed written impression and on a four-point social distance scale. The findings indicated that the three responses to conflictual stimuli can be reliably categorized, that the organizational pattern of stimulus presentation affects attitudinal and affective features more than the direction of presentation, that subjects forming simplified impressions seem to be more extreme in their acceptance or rejection of the stimulus person, and that dependency on detail is lacking only for those forming "related" impressions.

The implications of the three processes subserving impression formation as general personality characteristics affecting other behavior have received some subsequent attention by Gollin (Gollin & Rosenberg, 1956; Gollin, 1960). Their relationship to a judgmental situation of distinctly different content was investigated (Gollin & Rosenberg, 1956). Rokeach's (1951) interrelations tasks requiring subjects to define and interrelate in a paragraph ten religious and political-economic terms was utilized. Protocols were organized according to the extent that subjects used hierarchical concepts--"clearly articulates the major subgroups and organizes them into a category. . ."

It was hypothesized that subjects employing the "related" responses to impression formation (thus, articulating and relating aspects of the field) should form more hierarchic concepts. Also it was expected that subjects who do not organize according to hierarchic concepts would be more extreme in accepting or rejecting the stimulus person. These hypotheses were confirmed in the analysis. The findings are supportive of a generality in cognitive style and a consistency in organizational tendencies for two rather distinct judgmental situations.

Much of the literature on impression formation is dominated by the Gestalt tradition (Asch, 1946; Kelley, 1950; Haire & Grunes, 1950; Gollin, 1954; Gollin & Rosenberg, 1956; Pepitone & Hayden, 1955; Luchins, 1957). It emphasizes a resolution of conflicting stimuli or traits into a coherent impression, but it does not address itself to the problem of how the conflict resolution is effected or to the contribution of situational and/or social conditions. Cohen (1961) refers to Zajonc's (1954, 1960) work on cognitive structure and applies his concepts of "transmission tuning" and "reception tuning" to this problem. Zajonc found that when an individual is "tuned to transmit" his cognitions to others he becomes more rigid and polarized, but when he is "tuned to receive" additional material his cognitive structure is less polarized and more flexible. The former structure is referred to as "polarized," the latter as "suspended." The expectations are that (a) under transmission tuning there would be a greater tendency to polarize his impression by excluding or suppressing or

minimizing one pole of the contradicting stimuli, (b) transmission tuning should discourage the search for additional information and if additional information is desired, it should represent one pole or another of the contradiction, and (c) high contradiction material should exaggerate the impact of different tuning sets.

High and low contradiction lists of ten traits were presented to two groups--one group set for transmission and the other set for reception. They were then asked to write an evaluation of "what sort of individual" they represented. These evaluations were then content analyzed regarding suspension-polarization tendencies. A post-experimental questionnaire was also administered as a check on the efficacy of the experimental conditions and to assess whether or not the subjects desired more information about the stimulus person and if so what kind. All of the above expectations were borne out by the experimental findings.

Therefore, it appears that two important factors affecting the formation of impressions are the degree of contradiction in the trait stimuli and the cognitive tuning to transmit or to receive on the part of the individual forming the impressions. Also, working from slightly different points of view, several investigators (Haire & Grunes, 1950; Pepitone & Hayden, 1955; Gollin, 1954; Cohen, 1961) have delineated a number of similar modes of conflict-resolving response. The investigation of relationships between these response "styles" and a number of perceptual and judgmental behaviors appears to be a promising area for future research.

Extending the investigation of the effects of "inconsistent" stimuli in impression formation in a slightly different direction, Luchins (1957) has employed behavioral descriptions that portray two distinct patterns in the study of primacy versus recency effects. Two blocks of information about a person were presented--one "introvertive" and the other "extrovertive." Presented singly and in combination this made possible four types of information: introvertive followed by extrovertive (IE), extrovertive followed by introvertive (EI), extrovertive (E), and introvertive (I). Three experiments were then performed.

In the first experiment each of four groups received a different one of the types of information and rated their stimulus person as to friendliness, shyness, and unfriendliness. The results indicate a decided tendency for the E stimulus person to be described as friendly and the I stimulus person to be described as unfriendly and shy. For the EI and IE groups, ratings supported very marked primacy effects.

In the second experiment the number of responses to the descriptions were expanded. Analysis of the responses revealed the same general results as in experiment one. Post-experimental questioning indicated that of the subjects receiving inconsistent information, 53 per cent of them noticed inconsistencies, 33 per cent noticed no inconsistencies, and 14 per cent failed to respond to the questioning.

In the third experiment an even broader questionnaire was devised, covering aspects of the stimulus person not explicitly dealt with in the descriptions. Interestingly, the 264 subjects showed a mean failure to respond to items of 3 per cent. They were able to

extend their inferences well beyond the limited descriptive information given. The same general primacy effects were found as before. Additionally, one-third reported no perceived inconsistencies, another third reported slight discrepancies, and the remainder reported an awareness of conflict.

In a subsequent investigation Luchins (1957) has sought to minimize the potent primacy effects in impression formation. Attempts were modeled after efforts to minimize "Einstellung" or set in problem solving situations, and the first block of information was compared to the set-inducing problems in problem solving. Four experimental conditions were constructed. Group 1 received standard conditions; group 2 received prior warning against forming first impressions; group 3 received interpolated warning against snap judgments; and group 4 received an interpolated numbers task.

The results showed a progressive decrease in primacy and an increase in recency from group 1 to group 4. In fact, groups 3 and 4 showed greater recency than primacy effects. The results are in line with predictions based upon results of volume measuring problems investigating the effects of "Einstellung" in problem solving situations.

Even further recency effects have been reported by Luchins (1958) when subjects were asked to state their impression of the stimulus person after both blocks of information. This finding indicates that when an impression is based on earlier information that becomes clearly structured, its influence on subsequent information does not lead to primacy effects.

Anderson and Barrios (1961) have criticized most primacy-recency studies for using too few communications and have employed a sequence of communications on separate issues to study order effects. Two experiments were performed. In the first experiment subjects judged 60 sets of six adjectives each as to favorability of impression. Four types of sets were constructed: type HL in which three favorable adjectives were followed by three unfavorable adjectives; type LH where the sub-sets of three adjectives were reversed; type GD where favorability of adjectives "gradually decended" from favorable to unfavorable; and GA where favorability "gradually ascended." In the second experiment subjects judged 90 sets of two adjectives with 0, 2, and 4 second intervals between the adjectives.

The results of the first experiment indicated marked primacy effects with some decrement over trials. Females showed greater primacy than males in the sets where the change of favorability was abrupt only. There were no significant effects of time interval or order of presentation in experiment two. These findings indicate that although Asch (1946) was correct as to the importance of primacy, that it was probably incorrect to assign the effect to the first adjective of a series. It appears that the critical events leading to primacy occur at the second and third adjectives. However, further investigation is needed to replicate these findings and explicate the parameters involved.

In contrast to most other investigators studying impression formation, Shapiro and Tagiuri (1958) and Shapiro, Tagiuri, and Bruner

(1955) have manipulated the response context rather than the stimulus context as the experimental condition. Shapiro and Tagiuri (1958) were interested in contextual affects on the inferences between two stimulus traits ("intelligent" and "independent") and two inferred traits, one definitely related ("responsible") and the other indefinitely related ("warm"). The order and definiteness of the inferential relations of the context traits to the stimulus traits were manipulated.

It was found that the strength of inference from the given traits to the dependent trait was inversely related to the strength of inferences from the stimulus traits to the contextual traits. No effect was found for the relatively independent trait--"warm." Also they corroborated their finding from the earlier experiment (Shapiro, Tagiuri, & Bruner, 1955) that there was some tendency for definiteness of inference to be weaker toward the end of the trait check list for the dependent trait. These findings are important in that they highlight some of the weaknesses involved in impression formation studies when the investigator specifies on an a priori basis the relevant dimensions to be employed. The resultant impression will undoubtedly be greatly affected by the dimensions made available to the subject by their interrelationships.

Intra-personal Processes

In consideration of the expected relations among experienced attributes and traits that constitute an individual's "implicit personality theory," Hays (1958) has seen the need to stipulate the formal relations which (a) underlie the inference of one trait from

another and (b) underlie the judgment of similarity among persons. Two models are presented which deal with these two types of relations. The corresponding models are the "Implication Model" and the "Similarities Model," respectively. This approach obviates the difficulties involved with specifying on an a priori basis the relevant dimensions to be utilized in impression formation.

In the Implication Model all possible pairs of stimuli are judged by the subject as to the likelihood that the second will occur given the first. This permits a rank ordering of degree of implication of each trait from each of the given traits in turn. Hays then applies his "multidimensional unfolding technique" to these rank orders to obtain a set of rank order dimensions which would best characterize them (cf. Bennett & Hays, 1960). However, the method is not clearly specified in the article. In an example the 56 pairs of eight trait-names--"warm," "cold," "dominant," "submissive " "intelligent," "stupid," "generous," and "stingy"--were rated according to the likelihood of occurance of one given the other. The results of the analysis were two rank order dimensions. The first orders the eight traits from warm at one extreme to cold at the other, meaning that the warm-cold pair represents the greatest difference both from each other as well as the greatest average distance for each from all the remaining traits. The "warm-cold" factor, thus seems most highly related to the other traits. This result is interesting in that it agrees with Asch's (1946) finding as to the centrality of warm and cold in impression formation. The second dimension obtained had "intelligent" and "warm" in the extreme

positions. This indicated that these traits are relatively central, but maximally unrelated to the factor responsible for the first dimension.

In the Similarities Model trait lists of hypothetical persons are made up using all combinations of traits. These lists are then presented in triads to obtain judgments as to which pair is "most alike" and which pair is "least alike." Then "the relative weighting of the different trait-names was estimated by tabulating the response triads which differed mutually from each other by only one trait-name." The resultant orderings according to relative weights are analyzed according to the multidimensional unfolding technique. In an example Hays constructed sixteen trait lists using all combinations of the four polar adjectives used in the first example. Four rank order dimensions resulted from the analysis: "good-bad," "intelligent-cold versus warm-stupid," "dominant and generous versus submissive and stingy," and "the stimulus lists having the same initial trait name appear closest together in most instances." The final dimension suggests that primacy contributes a fair amount to the judged similarity between trait lists.

Jackson (1960) has discussed the limitations of the multi-dimensional unfolding technique and, in spite of its weak ordinal measurement, and hence, only partial approximation to the Euclidean space, has suggested that it may be "promising for further research."

Jackson (1960) has also leveled a criticism toward the theoretical interpretations drawn by Asch (1946). He states that "'. . .while Asch specified a mathematical model, viz., addition for the formulation he

did not hold, he failed to specify a model for the formulation he proposed." Furthermore, " . . .the two alternative theoretical formulations presented by Asch. . .do not exhaust the logical possibilities. Thus, one might consider a more sophisticated additive model than did Asch, with adequate provision made for a consideration of the relationship between traits, for the distinction between central and peripheral characteristics, and for a metric to state precisely the quantitative position or 'proper place' of traits within a given personality." (p. 4.)

Jackson makes the suggestion that an appropriate method is the method of multidimensional successive intervals (Abelson, 1955; Messick, 1956a; Messick & Abelson, 1956; Torgerson, 1958). Jackson, Messick, and Solley (1957b) have demonstrated the feasibility and desirability of applying the procedure in defining the structure of "implicit personality theories." In an exploratory and methodological study they have utilized the procedure to determine the manner in which naive subjects categorize other people. Relative similarity ratings were obtained for all possible pairs of twenty-nine individuals well known to each other. Additionally, information was obtained on the personalities of the subjects in order to identify obtained dimesnions of perceived similarity. The information consisted of Stern's Activities Index (1956) which provides measures of each of Murray's (1938) 40 bipolar needs, friendship ratings, age, and ACE intelligence scores.

The multidimensional method of successive intervals yields the number and structuring of dimensions underlying the perceived personality

relations. Four dimensions were obtained, three of which accounted for the major portion of the variance. The three dimensions were identified as follows: "theoretical-intellectual," "friendship," and "age-status."

This study represents a significant extension to the area of person perception. The method has been applied to a variety of areas in psycho-physics (cf. Messick, 1956a), to the perception of attitude relationships (Abelson, 1955; Messick, 1956b), and to a study of similarity as a determinant of friendship (Morton, 1959).

In the method, judgments of similarity between two stimuli are obtained and then translated into estimates of psychological distance. If the psychological distances meet certain assumptions of Euclidean geometry, then the stimuli may be considered as points in a Euclidean space with the psychological similarity-dissimilarity being represented by the distance between the two stimulus points. Finally, the dimensionality of the space as well as the scale values of the stimuli on these dimensions may be obtained (Messick & Abelson, 1956; Torgerson, 1958). The method is probably one of the most acceptable that has been developed to date to describe the structuring of an individual's similarity judgments between stimulus pairs and is entirely suitable to the person perception domain.

Another rather recent approach to determining the meaningful dimensions upon which a particular person perceives an object person has been made by Beach and Wertheimer (1961). Theirs was a free response approach in which a modification of Kelly's Role Content Repertory Test (1955) was used. Subjects were asked to think of twelve

individuals who fit the classes formed by all combinations of the following: well known--not well known; higher, lower, equal status; and same and opposite sex. Written descriptions of the twelve individuals were then examined and content categories established. Then a content analysis was performed as to frequency and occurrence of categories. It was found that different subjects use different categories for rating the object persons, that the same subjects use different categories or a different weighting of categories for different object persons, and that the same subjects use different categories or different weighting of categories for the same object person over time.

Another recent and rather unique method in delineating dimensions of impression formation has been employed by Levy and Dugan (1960). Their point of departure is intercorrelations between trait judgments. In order to separate the effects of "dimensions of judgment" from the "halo effect" and from the "logical error" (giving similar ratings for traits that seem logically related in the minds of the raters) in the judgment of traits of photographs, each trait judgment was made for a different photograph. The claim was made that previous studies such as that of Asch (1946) do not control for "logical error" and that studies of relationship between trait ratings, viz., Hays (1958), reflect learned relations while their findings represent "more basic dimensions of social perception."

A factor analysis of the trait intercorrelations, rotated to simple structure, yielded four factors which were interpreted successively

as "General Evaluative," "Harmfulness," "Dependability," and "Affability." As a side light, one of the fifteen bipolar traits intercorrelated was "warm-cold." In contrast to the findings of Asch (1946) there was no support for its centrality. Its only significant correlation was with "stable-unstable," and it failed to have significant loadings on the factors extracted. The authors suggested that their "basic social perceptual dimensions may represent the perceptual counterparts of certain personality parameters of the judges."

Stable personal attributes as determinants in impression formation. Although Asch's (1946) original study has stimulated numerous subsequent experiments, it is interesting that virtually nothing has been done to follow up the following statement made in that article:

> We have not dealt in this investigation with the role of individual differences, of which the most obvious would be the effect of the subject's own personal qualities on the nature of his impression. (1946, p. 283.)

Those few studies that have investigated personal qualities as determinants in impression formation will be organized into (a) stable personal attributes as determinants in impression formation and (b) experimentally induced personal attributes as determinants in impression formation.

Gollin (1958) has extended his earlier investigations (Gollin, 1954; Gollin & Rosenberg, 1956) to the study of developmental aspects of impression formation, controlling age, sex, I.Q., social background, and direction of presentation. Subjects ranged from 10 to 17 years of age. They were presented a five-scene silent motion picture of a boy. The first scene showed a close-up of the boy to familiarize the subjects

with his appearance. The other scenes followed in sequence. Two scenes described socially approved behavior and two scenes described socially disapproved behavior. Their written responses "telling someone about him" were analyzed into the following content categories: (a) "articulation of divergent qualities are lacking"--description or lack of inference (called "simplified" in Gollin's earlier [1954] study), (b) "not only descriptions of action but inferences about one or another of the perceived action sequences"--"inference" (previously called "aggregated"), and (c) "not only perception of action sequences but inferential efforts encompassing the diverse actions within the personality of a single individual"--"concept" (previously termed "related").

Differences in kind of response are associated with the controlled factors except for the direction of presentation which seemed to have no systematic effect. Interestingly, females exceed males in the use of both "inference" and "concept" at virtually all ages.

Sex differences in trait meanings have been investigated by Shapiro and Tagiuri (1959). Four groups of 160 male and 60 female subjects were presented a "given" trait and 59 other "list" traits. The subjects were asked to rate on a five-point scale the definiteness with which a person possessing the "given" trait also possessed a particular "list" trait. Each of the four groups received a different "given" trait. No differences in the distribution of responses on the "list" traits for any particular "given" trait were found between the sexes. The principal difference found was that women tended to give

more extreme definite judgments than men. However, individual variability was far larger than group differences. Some slight differences in connotative meaning was found. Women more than men perceived an "intelligent" person to be "efficient," "responsible," "independent," and "reliable;" whereas, men infer the traits of "sympathetic" and "witty" more than women. "Considerate" is related to "reliable," "submission," and "indolent" for women more than men. "Independent" relates to "efficient," "responsible," "practical," and "efficient" for women and to "intellectual" and "humorous" for men. "Inconsiderate" means "impractical," "hypocritical" not "neat," not "responsible," and not "conscientious" for women more than men and not "unimaginative," or "nonintellectual," or "enthusiastic," but "witty" for men.

Women then tend to infer more readily than men traits denoting responsibility and efficiency; whereas men infer more readily traits related to intelligence and humor. Differences in the extent of making extremely definite inferrences on the part of women may be a function of (a) a response set, (b) a perception of personality more definitely structured than men perceive it, or (c) a willingness to entertain more definitely extreme hypotheses on the basis of limited information.

A number of investigators have found that the perception of others is related to variables in the perceiver (Crockett & Meidinger, 1956; Fensterheim & Tresselt, 1953; Lindzey & Rogolsky, 1950; Stagner, 1948). But little has been done to couch such investigations in the Asch-type experiment. One exception is a study conducted by Benedetti and Hill

(1960). They were interested in whether the observer's possession of a given trait would effect the "centrality-peripherality" of that trait in the "Warm-Cold" type experiment. The traits "sociable-unsociable" rather than "warm-cold" were selected on the basis of a pilot study indicating their high centrality. Subjects were placed into three groups on the basis of amount of sociability as measured by the Gordon Personal Profile (Gordon, 1953). Then each group was divided into two subgroups at random--one group receiving a trait series containing "sociable," and the other group receiving an identical series except for the substitution of "unsociable." The rating procedure paralleled Asch's. An analysis of variance showed a significant groups x condition interaction; the significant effect was confined to the situations in which the series contained the trait "unsociable." Low sociability subjects gave the stimulus person the most favorable ratings; the middle sociability subjects gave less favorable ratings; and the high sociability subjects gave the least favorable ratings. Therefore, at least for sociability, the observer's possession of the trait affects the centrality of that trait in impression formation.

Jones (1954) has also investigated the role of the judge's personality in first impression formation. Authoritarian and non-authoritarian groups as determined by the California F scale received limited information about a prospective leader which varied on two dimensions--personal power (forceful or passive) and leadership attitude (autocratic or democratic). Subsequently, they wrote a brief descriptive personality sketch and rated the object person on a 30 trait scale

composed of polar opposites.

It was found that nonauthoritarians are more sensitive to the personality characteristics of others than authoritarians. Authoritarians showed a greater tendency to differentiate their environment in terms of power related concepts that did nonauthoritarians; were more positively evaluative of their leader than nonauthoritarians; prefered autocratic leadership whereas nonauthoritarians prefered democratic leadership; and were not more rigid than nonauthoritarians.

Scodel and Freedman (1956) have also investigated the role of authoritarianism in impression formation. Their principal finding was that the high-authoritarian perceiver tends to view peers as high in their level of authoritarianism, whether these peers are high or low. The estimates on the part of low-authoritarians, on the other hand, were more variable and were in the middle or high range regardless of the level of authoritarianism in the stimulus person.

Kates (1959) obtained judgments similar to those of Jones but altered his design in at least three ways: (a) two stimulus persons were presented to each subject rather than one, (b) the stimulus persons were presented as college peers rather than as a prospective leader, and (c) the stimulus persons were presented as high and low authoritarians rather than varying autocratic-democratic leadership and forceful-passive power.

The results indicated that high-authoritarian subjects perceived the stimulus person as "manifesting significantly more authoritarianism, power, leadership, social sensitivity, positive traits, and personal attractiveness than did low authoritarian Ss." The high-authoritarian

stimulus person was perceived as "possessing more power, leadership, positive traits, social sensitivity, and personal attractiveness than the low-authoritarian stimulus person."

DeSoto, Kuethe, and Wunderlich (1960) had high and low authoritarians rate pictures of strangers on personality traits and, subsequently, rate themselves on the same traits. It was found that high-authoritarians exhibited more fear, suspicion, and condemnation of strangers than low-authoritarians, while glorifying their own virtues. The high and low authoritarians showed little differences on measures of tendency to dichotomize, rigidity, acquiescence, and other aspects of behavior. It was suggested that differences on such variables found in other situations are not central to authoritarianism but depend on the high-authoritarian's fear and suspicion of others.

Carlson (1961) was concerned with the influence of general needs and sets on impression formation. Needs were measured by the Edwards Personal Preference Schedule. Three personality descriptions composed of items related to the need scales on the Edwards Personal Preference Schedule were presented. One experimental group was instructed to read the descriptions to choose which they would most like as a friend. The other experimental group was set to choose the best leader in a social group on campus. Subjects then wrote personality descriptions of each personality.

The findings indicated that (a) subjects recalled more characteristics related to their high-intensity needs than to moderate-intensity needs, (b) the number of subjects recalling each characteristic was

positively related to the desirability of the characteristic for the set, (c) subjects recalling many characteristics differed in need structure from subjects recalling few characteristics, and (d) for subjects as a whole information relating to some needs were recalled more frequently than information relating to other needs.

Chance and Meaders (1960) also used the Edwards Personal Preference Schedule in an investigation of person perception. Subjects listened to two short interviews and were asked to judge how the individuals involved answered the schedule. The more accurate judges saw themselves as persons active and outgoing in social relationships, liking others, ascendent but not hostile or competitive, and not given to intellectual reflections about their interpersonal relationships.

Experimentally induced personal attributes as determinants in impression formation. Leventhal (1962) has also drawn upon the findings of Zajonc (1960) in investigating the effects of the set to "transmit" or "receive" on change in impression formation. In accordance with Zajonc's findings, "transmitters'" impressions should be more organized and resistant to change while the opposite should hold for "receivers." Highly and moderately discrepant information was supplied after the initial impression to exert pressure to change impression. It was hypothesized that large pressure for change should affect the highly organized structure of the "transmitter" since the pressure effects not only "the elements directly inconsistent with the information, but . . .all elements dependent upon or related to them." It was found, however, that "receivers when compared to transmitters were more intent

upon recognizing and interrelating the discrepancies, their second impressions became more differentiated and had more elements that were new and more that were similar to their initial impressions. Transmitters preferred the second autobiographical sketch, and formed new impressions which were relatively less differentiated and more tightly organized." (p. 14.)

The relative impotency of discrepant information to produce the hypothesized change is likely a result of the comparative stability and strength of the organization of the transmitter's impressions. The results when compared with those of other investigators attest to the important role of motivational forces in the initial organization of impressions and in the way in which discrepancies are reconciled.

It is the contention of Jones and deCharms (1958) that altogether too little attention has been given to aspects operating in impression formation other than the stimulus person's internal states or personality characteristics. They feel that "we often need little or no information about these characteristics in order to complete the process." Roles are seen as playing a vital determining part by indicating the quantity of information required, kinds of information, and the kinds of inferences to which the information gives rise. Three general inferential sets are distinguished: (a) value maintenance--facilitation of goal attainment, (b) causal-genetic--deterministic analysis of another person's personality, and (c) situation-matching--evaluating the correctness of another person's behavior in terms of norms which are perceived to be relevant.

In an experiment two stimulus persons were presented via a recorded interview to four groups of subjects--three of which had been subjected to the above sets and the fourth being a control group. Both stimulus objects were prisoners of war who had apparently given aid to the enemy. One was strong-willed and operating under vague norms, and the other was weak-willed and operating under clear norms. The situation-matching raters rated the "strong" person as relatively less personally acceptable, less patriotic, and more opportunistic; whereas, the "weak" person was rated relatively more positively on these same characteristics. These results indicate a prepotent effect on impression formation by the role that a perceiver is taking. The situation-matching person concentrated on the responsibility of the stimulus person; whereas, subjects in the other sets acted according to the general cultural sterotype of a likeable person--deemphasizing the responsibility factor.

Triandis and Triandis (1960) in an investigation of social distance have shed some light on the importance of the cultural expectations of individuals in impression formation. Sixteen stimulus persons were rated on an equal-interval social distance scale. The 16 imaginary persons were constructed from combinations of one of two levels of four characteristics--race (Negro-white), occupation (high prestige or low prestige), religion (same as the rater or different from the rater), and nationality (with high-low social distance). The selection of the stimuli according to a factorial design permitted the estimation of amount of variance in social distance scores controlled by

each of the characteristics. The findings were that 77 per cent was accounted for by race, 17 per cent by occupation, 5 per cent by religion, and 1 per cent by nationality. The suggestion is made (Triandis & Triandis, 1962) that cultural norms exist concerning the expected social distance that is correct towards various types of people. In general it is likely that there are also norms of cultural expectation that concern not only social distances for various classes of persons but also the personality characteristics that they are likely to possess. Cultural expectations undoubtedly play a fundamental role in interpersonal perceptions.

Impression formation is governed only partially by the characteristics of the stimuli presented. In addition, the judges' attitude toward the person being judged (Thorndike, 1920), his "theory" of how traits are related to each other (Hays, 1958), his emotional state (Feshbach & Singer, 1957; Murray, 1933), the underlying structure of the perception itself (Asch, 1946; Levy & Dugan, 1960; Wishner, 1960), the context in which the stimulus person is presented for judgment (Levy, 1960, 1961a), and the cultural expectations of the judges (Triandis & Triandis, 1960, 1962) all enter into the process. One additional factor involved was investigated by Levy (1961b), that of learning.

On the basis of Levy and Dugan's (1960) findings two questions were formulated. Can perceptual dispositions be modified by differential reinforcement? And will changes in dispositions in one dimension generalize to other dimensions consistent with their correlations

with that dimension? Using a situation where facial photographs were judged on bipolar traits of varying relation to the conditioned bipolar trait, findings were supportive of a "yes" answer to both questions. Beyond this their findings are consistent with Wishner's (1960) finding that in impression formation changes in information input have predictable results in the concurrent changes in impressions, thus suggesting that it should ultimately be possible to predict what effect any given bit of informational input into one part of the system has upon any other part.

Chapter III

THE MEASURING INSTRUMENTS

Introduction to the Measuring Instruments

Two principal classes of measuring instruments can be distinguished in the present research, (a) instruments for measuring individual differences in perceived trait similarity and (b) instruments for measuring possible determinants. For the first class, parallel forms of a rating scale were devised and constructed for obtaining ratings as to the perceived similarity between pairs of traits by individuals. The second class of measuring instruments attempts to assess as broadly as possible sociological, personality, and ability attributes that might be relevant. In addition to those measures that were constructed and administered by the experimenter, there were two kinds of scores available on most of the subjects from the University Testing Bureau, Kuder Preference Record and School and College Ability Test (SCAT).

For ease of administration and scoring, all of the instruments that were administered as a part of the research were constructed so that the cover sheet on the test booklet was a characteristic color. Also, for those measures where it was feasible a separate answer sheet printed on the same color sheet as the Instruction Sheet was constructed. This permitted the use of stencils for hand scoring purposes and facilitated keeping the appropriate answer sheet with a particular booklet.

In those cases where the name of the particular questionnaire, if it had been printed on the Instruction Sheet, might have affected the

responses of the subjects, an innocuous title was used. The color code or the characteristic color of each of the measuring instruments and the scales that each contains are given in Table 1.

In this chapter a brief discussion of each of the measuring instruments used will be given. An attempt will be made to report for each measuring instrument (a) the rationale for choosing it, (b) an interpretation of the meaning of the scale or scales it contains, (c) reliabilities, (d) number of items in each scale, (e) the range of possible scores for each scale and what high scores mean, and (f) the method of scoring.[6]

Trait Similarity Rating Scale

The research instrument central to the present study is the "Trait Similarity Rating Scale" (TSRS). At the outset of the research it was desired to determine for each individual the similarity relations between traits typically employed in the description of others, these similarity relations constituted the individual's "implicit personality theory." Obviously, there is an almost unlimited number of traits that persons could use in the description of others. Allport and Odbert (1936) counted 17,953 trait names in English; however, many of these were either synonyms or represented temporary rather than permanent trends. Cattell (1945) in a rather exhaustive study of ratings found 131 "phenomenal clusters" or common traits that exist in the general population. These were grouped into 50 "nuclear clusters" of related traits, which in turn were arranged in 20 "sectors of the personality

[6]Also, an attempt was made to include in the Appendix a cross reference of items with other scales from which they may have been taken, and scoring keys.

Table 1

Names and Colors of the Measuring Instruments Employed
In the Battery and the Scales that they Contain

Names of Measuring Instruments	Color Code	Scales Contained in the Particular Measuring Instruments
Biographical Data Sheet (BDS)	yellow	
Trait Similarity Rating Scale Form A (TSRS-A)	green	
Personality Inventory (PI)	yellow	a. Cycloid Disposition (C) b. Rhathymia (R) c. Thinking Introversion (T) d. Cooperativeness (Co) e. Extroversion (E) f. Neuroticism (N)
Public Opinion Questionnaire (POQ)	blue	a. California F scale (F) b. Negative California F Scale (NF) c. Tolerance-Intolerance of Ambiguity Scale (T-IAS)
Trait Similarity Rating Scale Form B (TSRS-B)	gray	
Estimation Questionnaire (EQ)	pink	Category Width Scale (CW)
Biographical Inventory (BI)	gold	Social Desirability Scale (SDS)
Interpersonal Rating Scale (IRS)	buff	a. Evaluative Rating of "The Average Person" (E_a) b. Evaluative Rating of "People as a Whole" (E_w)

sphere." So it appears that somewhat less than 17,953 traits are utilized by most individuals and that those that are used may be grouped into a rather limited number of classes of related traits. Cattell's (1957) later factor analyses were aimed at determining "source" traits that underlie the several sectors or "surface" traits of the personality sphere. Actually, until recently investigators have been interested primarily in this latter pursuit, that of considering traits as functional unities (that is, in determining covariation between traits and the underlying dimensions which explain that covariation).

However, the semantic differential developed by Osgood (see Osgood, Suci, and Tannenbaum, 1957) has brought to the fore an interest in the traits that individuals use to describe other people and things, and how these traits are organized within a person. And although individuals vary considerably in their meaning structures, i.e., in their "semantic spaces," a number of factor analyses have been performed which have delimited the traits which people use and which have suggested basic dimensions of general semantic spaces and factor loadings of traits on them. Most semantic differential work has, however, considered meaning structure as it applies to "thing" concepts as well as to "interpersonal" concepts. A notable exception to this is some recent factor analytic experiments by Osgood and Ware (1961). They have restricted the concepts to be rated to "personality concepts" and the traits to those which find suitable application to the rating of personality concepts. However, some of the so-called personality concepts included were "spiders," "cats," "dogs," "lambs," and "cows." No doubt these concepts have personalities,

even though it is a little difficult to imagine a sophisticated versus a naive cow. The effect of including nonhuman personality concepts upon the resulting factor analyses are unknown.

The principal problem in the construction of the Trait Similarity Rating Scale was the selection of traits. Little in the way of guidence was available here, but the results of Osgood, Suci, and Tannenbaum (1957) and of Osgood and Ware (1961) were of assistance. The approach was to select traits or related traits from a large number of the factors obtained in the factor analytic studies of the measurement of meaning. Many of the same trait-names appear in the scales used in the various studies.

The criteria for the selection of trait-names for the Trait Similarity Rating Scale were as follows: (a) "factorial composition"--representation of each factor in the semantic space with an equal proportion of trait-names as far as possible (if a subject makes more use of one factor relative to others this will show up in his data), (b) "relevance"--selection of trait-names descriptive of persons, (c) "semantic stability"--the trait-name must have a sufficiently understood and a sufficiently accurate definition so that its meaning does not vary extensively either within or between individuals, (d) "unipolarity"--the meaning of a trait-name must be conveyed unambiguously when presented singly, and (e) "nonphysical"--the trait-name should be descriptive of the personality and not the physical attributes of individuals.

A broad sampling of the total "semantic space" of trait-names was necessary both for generalizability of findings and for maximizing the

magnitude of individual differences obtained from the analysis. If, for example, all traits sampled are clustered tightly around one point in the semantic space for the average individual, individual differences in meaning spaces are less likely to occur than if trait-names are widely dispersed in this space.

It is at this point that a dilemma arises. Because the paired-comparison procedure for complete data requires every stimulus to be paired with every other stimulus, the number of items of stimulus pairs is related to the square of the number of stimuli. But the number of items in the instrument must be limited due to limits of time and ability of individuals to respond. Hence, for complete paired-comparisons data, the number of stimuli or trait-names permitted is rather small. And the smaller the number of trait-names, the less likelihood there is that the "space of trait-names" for the average individual will be broadly sampled.

It should be pointed out that the principal purpose of the present research--the correlation of individual coefficients representing individual differences in perceived personality trait relationships with certain personality and sociological variables--does not require complete paired comparison data. Incomplete interlocking (or even no overlapping) of stimulus trait-names in the paired-comparison items would serve equally as well as complete data in yielding the desired individual coefficients. However, it is desirable to examine the subordinate problem of the structure of trait relationships (i.e., the perceptual space) for idealized individuals obtained in the analysis. And, if the data are not highly incomplete, a rather good representation can be obtained through

analysis of incomplete data. The utilization of incomplete data permits a larger number of trait-names to be represented in the same number of items in the Trait Similarity Rating Scale. Hence, a larger and more representative sampling of the semantic space is permitted, at the same time allowing for an examination of the structure of the perceptual space of trait relations of idealized individuals.

Fifty traits were selected for use in this study and are contained in Table 2. Random sampling of pairs of these traits was used in constructing the Trait Similarity Rating Scale. In order to assess the reliability of the scale it was considered advisable to construct two parallel forms, Form A and Form B. Form A was constructed from the first 300 pairs drawn at random from the total possible number of pairs, 1,225. A second nonoverlapping sample of 300 pairs constituted Form B. Thus, 600 pairs of the 1,225 possible pairs of the 50 trait-names were included in Forms A and B combined. Both the selection of pairs of trait-names and the selection of which of the two trait-names in any given pair was to appear at the left end of the rating scale were made from tables of random numbers. The pairs of trait names, identified by numbers, constituting the various items of TSRS-A and TSRS-B are given in Appendix A.

Placed to the right of each pair of trait-names in the TSRS was an eight-point rating scale which ran from -4 (extremely dissimilar) to +4 (extremely similar) with the 0 or neutral point omitted. In consideration of the difficulty of the task, it was felt that it was preferable to force ratees to make a decision one way or the other rather than let them fall into the easy trap of assigning an 0 rating. Also, the points on the

Table 2

Trait Numbers of the Trait-Names Appearing in the Trait Similarities Rating Scale

Trait No.	Trait Name	Trait No.	Trait Name
01	Humorous	26	Unemotional
02	Tense	27	Predictable
03	Active	28	Relaxed
04	Dishonest	29	Youthful
05	Unsociable	30	Changeable
06	Selfish	31	Awkward
07	Graceful	32	Brave
08	Weak	33	Aggressive
09	Naive	34	Cooperative
10	Unintelligent	35	Sociable
11	Passive	36	Irrational
12	Unusual	37	Competitive
13	Mature	38	Optimistic
14	Interesting	39	Honest
15	Submissive	40	Aimless
16	Rational	41	Sensitive
17	Emotional	42	Stable
18	Cowardly	43	Unpredictable
19	Proud	44	Intelligent
20	Strong	45	Pessimistic
21	Insensitive	46	Sophisticated
22	Unselfish	47	Domineering
23	Humble	48	Defensive
24	Motivated	49	Serious
25	Typical	50	Uninteresting

numerical scale were defined in such a way that it was felt that the "distance" between -1 and +1 was equal to the distance between any two other adjacent numbers on the scale. In the analysis of the data the original numerical scale values were first transformed by adding .5 to the negative scale values and by subtracting .5 from the positive scale values. The original numerical scale values as they appeared on the TSRS and the transformed scale values that were used subsequently in the analysis along with their definition or description are presented in Table 3.[7]

Table 3

Trait Similarity Rating Scale Numerical Values, Corresponding Transformed Values, and Their Definitions

TSRS Numerical Values	Transformed Values	Definitions
4	3.5	Extremely Similar
3	2.5	Considerably Similar
2	1.5	Moderately Similar
1	.5	Slightly Similar
-1	- .5	Slightly Dissimilar
-2	-1.5	Moderately Dissimilar
-3	-2.5	Considerably Dissimilar
-4	-3.5	Extremely Dissimilar

Further clarification of the meaning of the points on the rating scale together with some examples was given on the instruction sheet of the TSRS. The instructions were careful to point out that two elements

[7]Since the analysis had no provision for missing data on the TSRS, it was assumed in those few instances when a rater failed to respond to a particular rating scale that he was in conflict and did not perceive a clear similarity or dissimilarity in the pair of trait-names. In these cases the most nearly equivalent response, a -1 or a +1, was assigned at random.

or characteristics of trait-name similarity-dissimilarity were to be considered simultaneously in making the rating. The two elements were (a) degree of similarity-oppositeness and (b) degree of relatedness-unrelatedness. Ratings near the extremes of the rating scale were indicative of judgment that the two traits which were rated were "highly related" and either "highly similar" or "highly opposite," depending on which end of the scale was marked. On the other hand "marks near the center of the rating scale indicated 'relative unrelatedness' of the traits" which were judged. These explicit instructions were given to prevent the rater from misusing the rating scale through the misinterpretation of "dissimilarity" as being "unrelatedness." The instruction sheets for Form A and for Form B of the TSRS were identical with the exception that the former was printed on green paper and had "Form A" printed on it and that the latter was printed on gray paper and had "Form B" printed on it.

The Biographical Data Sheet

In this investigation a number of personality and ability tests were administered. In addition to these it was considered important to investigate the role of a number of biographical factors, particularly those of a sociological nature. A three page booklet titled the "Biographical Data Sheet" (BDS) was constructed. It asked the subjects to report among other things their major; age; sex; year in college; grade point average; religion; religious activity; state of health; if they had any handicaps; the size of their home community; the age, occupation,

and education of both their father and mother; number of older and younger brothers and sisters; and "ratings of the warmth and strictness" of their parents as they perceived them when the subjects were in high school.[8] The subjects were assured by conspicuous printing on the booklet that their responses were "C O N F I D E N T I A L."

To facilitate the coding of responses to the Biographical Data Sheet and the punching of the data onto IBM cards, the parental ratings on pages two and three of the BDS as well as any other remarks the raters may have made were transferred to page one. The second and third pages were then removed and discarded. Appropriate blanks for coding the responses on the BDS as well as all of the other variables were mimeographed in the margins of the BDS. Finally, the coding of the BDS was completed on the appropriate blanks.

The classification of home community into meaningful categories presented another problem. The interest was in determining how the size of one's home community related to one's perception of trait relationships. In this sense it was logical to conceive of the influence as something close to a logarithmic function of the size. Keeping this in mind as a basic guide, natural divisions in the distribution were examined. On the basis of these two criteria, the classification and coding, presented in Table 4, was established.

[8]The suggestions of Dr. Wesley C. Becker in the composition of the scales are gratefully acknowledged.

Table 4

Classification and Coding of Size of Home Community

Code	Intervals
1	1 - 2,000
2	2,001 - 5,000
3	5,001 - 15,000
4	15,001 - 35,000
5	35,001 - 80,000
6	80,001 +

Occupations of both fathers and mothers were rated according to the rating procedure developed for occupations by Warner, Meeker, and Eells (1949) in the computation of an Index of Social Class (I.S.C.) for obtaining an equivalent social class. In computing I.S.C. Warner et al. rated four status characteristics, viz., occupation, source of income, house type, and education. The characteristics are assigned weights of four, three, three, and two, respectively in arriving at the I.S.C. Thus, it is seen that the rating of the status characteristic of occupation is heavily weighted in their system in determining a person's social class. Since not all occupations can feasibly be included in the descriptions of occupations characteristic of a particular rating, there is some room for personal interpretation. For this reason it was considered desirable to get some indication of rater reliability. Therefore, two ratings of each father's occupation and of each mother's occupation were made--one by the writer and one by a second year graduate student in social psychology. Because the occupation of the vast majority of mothers was

"housewife" which was not conducive to social status rating, this variable was dropped from any further analysis. However, based upon an N = 181 the rater reliability estimate obtained from the correlation between the ratings of the two raters was r = .91 which was considered acceptable. The ratings ranged from 1 to 7 inclusive; the smaller the rating the higher the socioeconomic status of the occupation being rated. A copy of the Warner et al. (1949) scale used to rate occupations is found in Appendix B.

The other variables beside size of home community, and father's occupation were coded as indicated in Table 5.

The Personality Inventory

Fundamental to the present research is the need to identify the principal personality traits of the subjects. Two of the main sources of such measurements are the Guilford inventories (Guilford, 1940; Guilford & Martin, 1943a; 1943b) and the revised 16 PF (Cattell, Saunders, and Stice, 1957) which have been developed through factor analytic procedures. In attempting to "bring some integration to the questionnaire personality factor area by demonstrating similarities among the Cattell and Guilford inventories at the correlational, first-order, and second-order factor levels," Becker (1961) has obtained some results that negate the necessity of administering all or any of the inventories in toto. Two of the estimates of each factor were obtained. Forms A and B of the 16 PF were scored separately. And for the Guilford inventories, odd-even split-half scores were computed for the thirteen factors. These variables were then intercorrelated, factored, and rotated using both an oblique

Table 5

Coding of Variables Contained in the Biographical Data Sheet

BDS Variable No.*	Variable	Code
2	Age	Age in years
3	Sex	Male = 1; Female = 2
4	Year	Fr. = 1; Soph. = 2; Jr. = 3; Sr. = 4
5	Grade Point Average	Grade point average times 10^2
6a	Religion	Protestant = 1; Catholic = 2; Jewish = 3; Other = 4
6 b	Activity	Active = 1; Inactive = 2
7	Health	Excellent = 1; Fair = 2; Poor = 3
8	Handicaps	Yes = 1; No = 2
11	Father's age	Father's age in years
13	Father's education	Highest grade father completed 1 to 16 inclusive. 16+ coded as 17
14	Mother's age	Mother's age in years
15	Mother's occupation	Warner's scale 1 to 7 except housewife which was coded "-"
16	Mother's education	See Father's education above.
17a	Number of brothers	Number of brothers
17b	Number of older?	Number of older brothers
17c	Number of younger?	Number of younger brothers
18a	Number of sisters	Number of sisters
18b	Number of older?	Number of older sisters
18c	Number of younger?	Number of younger sisters
19	Total number of brothers and sisters	Total number of brothers and sisters
20	Warm-cold rating of Father	Extremely warm = 1; Quite warm = 2; Not much warmth = 3; Somewhat cold = 4; Mainly cold = 5
21	Warm-cold rating of Mother	See rating of Father's warmth above.
22	Lenient-strict rating of Father	Extremely lenient = 1; Quite lenient = 2; More lenient than strict = 3; Quite strict = 4; Extremely strict = 5
23	Lenient-strict rating of Mother	See rating of Father's strictness above.

*Classification and coding of BDS variable number 1, major, will not be reported because of the decision to eliminate it from further analysis. Variable number 9 was home address and was not coded. Variable number 10, size of home community, is classified and coded in Table 4. Variable number 12 was coded according to Warner et al. (1949); the basis for the classification and coding is found in Appendix B.

and an orthogonal rotation (since Cattell used oblique factors and Guilford used orthogonal factors). The principal conclusions that were derived were that there is considerable equivalence of factors both within and between Guilford's and Cattell's inventories; that intercorrelations between Guilford's and Cattell's factors fell into two blocks of variables, those associated with a second-order anxiety factor and those associated with a second-order extraversion factor; and that there were, at best, only five distinguishable factors being measured by Guilford's thirteen factors and only eight being measured by Cattell's 16 PF ("only two or three of these with sufficient reliability for individual prediction"). On the basis of the obtained results, Becker (1961) recommends that, "the user of the Guildord inventories could save time and effort by only scoring for T, C, R, M, and Ag or Co." These factors load highly on the first five factors extracted. Also since sex loads sufficiently high on the masculinity-feminity factor to describe it, factor M, masculinity, need not be scored. In the present research it was decided to obtain a score for Co rather than Ag, the choice being quite arbitrary.

Emotional instability, C, loads highly on the first factor extracted, "Anxiety-Emotional Stability." Rhathymia, R, loads heavily on the second factor, "Extraversion-Introversion." The person scoring high on R is further characterized by his happy go lucky, carefree, unconcerned disposition. Co, cooperativeness, has a large loading on the third factor, "Hostility-Cooperativeness." The person with a high score on this factor is tolerant and cooperative as opposed to being

fault finding and over critical. Thinking Introversion, T, loaded highly on the fifth factor extracted, "Thinking-Introversion-Extraversion." A large score indicates introspectiveness and reflectiveness on the part of the examinee. Factor four was a "Masculinity-Femininity" factor.

The meaning of R and T obtained from Becker's analysis agrees well with Guilford's (1959) description of them as "varieties of introversion-extraversion." Also there is agreement in the description of C as accounting for a large part of the syndrome of neurotic tendency or emotional maladjustment. This association can be further seen in the relationship of T, R, and C with the Maudsley Personality Inventory which measures extroversion (E) and neuroticism (N) (see Appendix C and Appendix D, respectively). Eysenck has long been an advocate of this questionnaire. Since most of the items contained in the Guilford scales C, R, and T are contained in the Maudsley Personality Inventory, it was decided to score the items comprising C, R, and T in terms of E and N as well. This decision was made after the inventory containing scales C, R, T, and Co had been composed, so there are nine items (see Appendix E) not included in the T, R, and C scales which are included in the Maudsley scales measuring E and N. However, it was felt that a sufficient number of items constituting E and N remained to define clearly the factorial composition of those scales. The items from T, C, and R corresponding to the items scored for E and N in Maudsley's Personality Inventory and their scoring key are included, respectively, in Appendices C and D.

In the interests of ease and time in the administration and scoring of the personality trait factors and to intermix the Co factor from the Guilford-Martin Personnel Inventory with factors T, C, and R, all of the items constituting these factors were randomly combined into one inventory, called the "Personality Inventory" (PI).

As scored by Guilford, the C, R, and T factors contain overlapping items. Hence, correlations between them are inflated simply because they contain common items (i.e., they are experimentally dependent). To obviate the difficulty of interpreting such correlations it was decided to randomly assign overlapping items to one scale or the other.[9] The results of this assignment are shown in Appendix F. The resulting C, R, and T scales are approximately 73 per cent as long as they were originally. Factor C was reduced from 73 items to 53 items, factor R from 70 items to 51 items, and factor T from 53 items to 38 items. Factor Co contains 62 items. The PI items comprising the final experimentally independent factors, the corresponding item numbers of the Guilford inventories from which they were taken and the scoring keys are found in the following Appendices: Factor C, Appendix G; Factor R, Appendix H; Factor T, Appendix I; Factor Co, Appendix J. Again it is felt that a sufficient number of items remain for each of the factors to maintain their factorial integrity. Also, the gain in clarity of interpretation of resulting correlations as a result of the independence of the factors is considered more than adequate to compensate in minimal losses in reliability incurred as a result of the truncation in the number of items.

[9]Of course, the Co factor was not affected since it came from a separate inventory with independent items; and, therefore, was already "experimentally independent."

The full scale reliabilities reported by various investigators for the factors range from .80 to .94. Testing 216 subjects, Becker (1961) reports the following full scale reliability estimates for the factors: C: .91, R: .83, T: .83, and C_o: .83.

The Public Opinion Questionnaire

The Public Opinion Questionnaire represents a composite of three groups of items. The first group constitutes the California F scale (F). All items in the California F scale are positive in the sense that agreement with the items represents the endorsement of authoritarian attitudes. The second group of items represents a reflection of some of the positive items into negative items by rephrasing of the statements such that agreement with the items represents the endorsement of non-authoritarian attitudes. And the third group of items constitutes the Tolerance-intolerance of Ambiguity Scale. Each of the scales represented by these three groups of items will be discussed in turn.

The California F scale. The first twenty-eight items of the Public Opinion Questionnaire represent items from the California F scale (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950). All but two items of the final 30 items appearing in Forms 45 and 40 were included. The excluded items represent items that are outdated. The scale was scored by adding algebraically the subject's responses which ranged from +3 to -3 with the neutral response 0 not permitted. The authors state that "this scheme was . . .used mainly because there seemed to be a greater psychological gap between -1 and +1 responses than between any other two adjacent responses." Thus, the possible range of total scores is -84 to +84 with

a high positive score indicating strong authoritarian attitudes. The inclusion of the California F scale seemed indicated because of the considerable amount of research that has been conducted in the past with this variable as a determinant in social perception.

Negative California F scale items. Items 29 to 44 inclusive in the Public Opinion Questionnaire are the 16 "reflected" or "reversed" items from the California F scale that are expressed in a negative form (i.e., disagreement with these items indicates strong authoritarian attitudes). The inclusion of these items was involved in recent evidence based upon correlations of reversed and unreversed forms of the California F scale that indicates that the F scale tends to elicit a response set to acquiesce which has a cumulative effect upon the scores (Bass, 1955; Chapman & Campbell, 1957; Jackson & Messick, 1957, 1958; Jackson, Messick, & Solley, 1957a; Leavitt, Hax & Roche, 1955; Messick & Jackson, 1957, 1958; Shelly, 1956; Zuckerman & Norton, 1958, 1961). Appendix K indicates the item number of particular items in the reversed scale and the item number of the corresponding unreversed item in the Public Opinion Questionnaire.

Messick and Frederiksen (1958) and Messick (1961) have developed formulas which partition the variance of the F scale into variance associated with acquiescene response set and variance associated with authoritarian content. These formulas were based on one of the models utilized earlier by Helmstadter (1957) for obtaining separate set and content scores for ability tests. Unfortunately, there is considerable confusion surrounding the formulas. In the original article reporting

their derivation, the formula for acquiescence response set is reported erroneously as follows:

$$S = \frac{\frac{F_a}{N_f} - \frac{U_d}{N_u}}{2 - C}$$

where F_a is the number of favorable or positive items agreed with

U_d is the number of unfavorable or negative items disagreed with

N_f is the number of items keyed in the favorable or positive direction

N_u is the number of items keyed in the unfavorable or negative direction

C is the value of the content score

$$\text{where } C = \frac{F_a}{N_f} + \frac{U_d}{N_u} - 1$$

The error is that the 2 in the denomenator should be a 1. Clayton and Jackson (1961) also report S with a 2 in the denomenator and also with C being an absolute value.[10] Messick (1961) found that using the algebraic value of C introduces some distortion over a portion of the distribution when applied to bipolar attitude scales. However, Messick's (1961) revised formula with the absolute value of C eliminates this distortion. In the derivation of the formula from the basic model C is equal to the hypothetical value $\frac{B_f}{N_f}$, where B_f is the number of favorable items that the examinee believes or endorses on the basis of content. Logically, B_f must always be a positive value; and, therefore, C must always be positive. The fact that C is sometimes found to be negative and must be adjusted by the use of the absolute value has been

[10]Clayton and Jackson have corrected the 2 to a 1 in mailing reprints of their article.

suggested by Dr. Ledyard R Tucker to be a basic indictment against the basic model.[11] The derivation of the formulas from the basic model is presented in Appendix L. In order to present further empirical evidence regarding the formulas and to tie the present research into previous findings, the content score, C, and the set score, S_1, obtained from the Messick and Frederiksen (1958) formulas and the Messick (1961) revision of the set formula, S_2, will be included in the analysis.

Dr. Harry C. Triandis[12] has suggested another acquiescence response set measure based upon reversed and unreversed California F scale items. The rationale behind this measure is that if an examinee answers a questionnaire in a perfectly consistent manner independent of acquiescence response set, the proportion of positive items agreed with plus the proportion of negative items agreed with would equal unity

$$\left(\text{i.e., } \frac{F_a}{N_f} + \frac{U_a}{N_u} = 1\right)$$

when $N_f = N_u$. The extent of acquiescence response set is indicated by the extent to which the proportion of positive items agreed with plus the proportion of negative items agreed with exceeds unity. The formula for the response set to acquiesce, R_a, is then expressed as follows:

$$R_a = \frac{F_a}{N_f} + \frac{U_a}{N_u} - 1 \quad .$$

Remembering that $N_f = N_u$ a simplified scoring formula R can be derived by letting $R = N_f R_a = F_a + U_a - N_f$. In the present research $N_f = 16$, $F_a = P$, and $U_a = Q$, and the simplified acquiescence response set measure derived from the number of positive and negative California

[11] Personal communication.
[12] Personal communication, also Triandis and Triandis (1962).

F scale items agreed with becomes, $R = P + Q - 16$. Of course, the correlational results obtained with the linearly transformed R will be identical with R_a. The mean and standard deviation of R will be 16 times larger than the corresponding values of R_a would be. The mathematical relations of P, Q, and R with C, S_1, and S_2 are of interest. It can be shown that if $N_f = N_u$, that $C = 1/16\ (P - Q)$,

$$S_1 = \frac{R}{16 - (P - Q)} \quad , \quad S_2 = \frac{R}{16 - |P - Q|} \quad .$$

Seven scores are obtainable from the positive and negative California F scale items. A total F scale score, F, can be obtained from the twenty-eight positive items. From the corresponding sixteen positive and sixteen negative items we can obtain an authoritarian content score, C; two set scores independent of C, S_1 and S_2; the number of positive items agreed with, P; the number of negative items agreed with Q; and an additional acquiescence response measure, R. All seven of these scores were obtained and included in the analysis.

The tolerance-intolerance of ambiguity scale. Another measure included in the Public Opinion Questionnaire was the Tolerance-Intolerance of Ambiguity Scale (T-IAS). It is an experimental Likert-type scale constructed by Buder (1959, 1962), and it has been applied to a number of research areas, including an investigation of personality variables affecting the performance of medical school students. Its nature and similarity in format with the California F scale make it directly amenable for inclusion under the general directions given for the Public Opinion Questionnaire. It consists of sixteen items, eight

are positive in the sense that agreement reflects intolerance of ambiguity and eight are negative in that disagreement reflects intolerance of ambiguity. The numbers of the eight positive and the eight negative items in the T-IAS are identified according to their POQ item number and the corresponding item numbers in Budner's scale are given in Appendix M. In arriving at a total score two stencil keys were constructed, one for the positive items and one for the negative items. The positive item ratings were summed; the negative item ratings were summed and the sign changed; and the two sums were then totaled to arrive at a total intolerance of ambiguity of ambiruity score. As with the California F scale the neutral or 0 response was not permitted, and the possible range of the total score was -48 to +48. Again, a high positive score reflects intolerance of ambiguity, and a high negative score reflects tolerance of ambiguity.

The test constructor has reported the "correlations between the scale and independent measures of acquiescence and social desirability showed it to be free of such artifacts." Reliabilities estimated by means of Cronbach's (1951) coefficient alpha ranged from .39 to .62, and a test-retest reliability estimate of .85 was reported. A number of research findings have substantiated its construct validity.

The Estimation Questionnaire

Since the present research is interested in the cognitive categories that individuals possess in relating traits, it seemed relevant to included a measure of cognitive style and particularly a measure of cognitive width to determine any relationships that might exist.

Bruner and Rodrigues (Bruner, Goodnow, & Austin, 1956) have demonstrated that individuals show marked consistency in the range or width of the cognitive categories that they employ. Using standard laboratory equiptment, such as color mixing wheels and audio-oscillators, these investigators asked subjects to select the extremes (such as, darkest and lightest; highest and lowest; loudest and softest; etc.) of a wide variety of stated categories. For such diverse categories. For such diverse categories as the brightness of an overcast sky and the pitch of a female singing voice, subjects tended to use in a consistent fashion broad, medium and narrow category widths relative to the total sample.

Pettigrew (1958) has developed The Category Width Scale (CWS), a paper and pencil measure of cognitive category width, that correlates quite highly with the apparatus measures used by Bruner and Roderigues. Pettigrew has reported an odd-even reliability estimate of .90. And a number of correlations with other personality variables have demonstrated its relative independence as a personality measure. Since no instructions are given along with Pettigrew's (1958) report of the test items, instructions were written along with the construction of the scale. To make the purpose of the scale unknown to the subjects Pettigrew's lead was followed in using the title of "Estimation Questionnaire" for the scale. Each alternative for question a and b of each item were weighted from 0 to 3 according to how near the extremes of the categories they were. The higher the score for each item, the broader is the category width. In order to minimize response sets, the alternatives to

each subitem were varied in their order of occurrance. To facilitate hand scoring, four separate stencils were punched (one for each weight) with holes corresponding to the positions on the answer sheet of the alternatives with that particular weight. Then scoring was accomplished by looking to make certain that there were no omissions, placing each stencil for a given weight in turn over the answer sheet, counting the number of responses to alternatives with that weight and multiplying the number by the weight for each stencil and adding the scores obtained for each stencil to obtain the single coefficient indicating size of category width. Of course, individual stencil scores need only be obtained for stencils corresponding to weights 1, 2, and 3, since the stencil score for the zero stencil is always equal to zero. The larger the total coefficient, the broader the category width for a particular person.

The Biographical Inventory

The trait-names contained in the TSRS constitute one kind of statement that can be made about a person. In addition to traits such attributes as physical characteristics, interests, behavior, attitudes, likes, feelings, motives, abilities, and defense mechanisms are used to describe persons. Edwards (1957) has denoted all such statements that can be made about persons as "primary description." According to Edwards, trait-names as primary description can be placed on a social desirability dimension and ratings of them are greatly affected by the social desirability response set. Since the present study contains a number of personality inventories (as well as the TSRS) whose scores

are affected by the social desirability of their items, it was decided to include a measure of the social desirability response set. The 39-item Social Desirability Scale (SDS) constructed by Edwards from MMPI items was selected. The MMPI item numbers corresponding to the item numbers comprising Edward's 39-item SDS and the scoring key are contained in Appendix N. The items are keyed in such a way that a high score represented a large social desirability response set.

Edwards reports no reliability estimate for the 39-item SDS; however, a corrected split-half reliability estimate for the 79-item scale obtained from a sample of 192 college students was substantial (.83). Since the 39-item SDS represents a refinement, although shortening, of the 79-item scale, the obtained reliability for the longer scale is probably quite indicative of the reliability for the SDS.

There has been considerable argument in the literature and elsewhere as to what the SDS measures. For example, if the items in a personality inventory designed to measure some socially desirable personality trait were to be keyed and scored according to the methods used in developing the SDS, the scores for social desirability and the scores for the trait would probably be highly correlated. Similarly, an inventory scored for social desirability and for a socially undesirable trait would yield scores that are highly negatively correlated. One argument has been that the SDS is confounded with personality trait measures. However, a score obtained from items measuring a personality trait independent of social desirability would be unrelated to a score obtained from items keyed for social desirability. For this reason, the

SDS was constructed from items, heterogeneous in content, belonging to a number of MMPI scales.

Another argument has been that since 30 of the 39 items are keyed "False," the scale may in fact be measuring a response set to dissent instead of a social desirability response set. However, Edwards (1957) has marshalled considerable evidence against such a hypothesis in terms of correlations of the SDS with other scales containing varying proportions of items keyed "True" and "False."

In a personal communication Dr. Wesley C. Becker has made the criticism that the SDS does not separate the "important personality characteristics of positive attitude to self and others" from social desirability. The suggestion was made that this can best be accomplished by utilizing the approach of Wiggins (1959). He constructed a social desirability scale (Sd) from MMPI items which differentiated subjects under standard instructions and subjects instructed "to decide which answer you think People in General would consider to be more desirable." However, there are also some problems with this approach. Subjects under standard conditions display varying amounts of dissimulation. That is, as Edwards (1957) has pointed out, the extent of social desirability faking in a "normal" group is unknown. Also, as Wiggins (1959) has stated, the procedure "introduces elements not present in the population to which results are generalized." For example, Grayson and Olinger (1957) using similar conditions reported that subjects commented: "Well, I just put down the opposite of what I did yesterday." (p. 75.) Edwards, Diers, and Walker (1962) included the social desirability scale developed by Wiggins (1959) along with

sixty other personality scales in a factor analysis and obtained three factors. The first was identified by the SDS, the second was identified "Acquiescence Response Set," and the third was identified by Wiggins' social desirability scale (Sd). On the basis of their findings, Edwards et al. interpreted the Sd scale as a measure of the tendency on the part of the subjects to lie. The social desirability response set as measured by various scales that have been proposed needs much clarification. It should be understood that the scores obtained from these scales, including the SDS, must be interpreted rather cautiously.

The Interpersonal Rating Scale

A number of studies directed toward the measurement of meaning and utilizing the semantic differential (Osgood, Suci, & Tannenbaum, 1957) have pointed toward the importance of individual differences in their use of an evaluative factor in rating the meaning of concepts. Dr. Wesley C. Becker has suggested that the extent to which a person characteristically evaluates concepts in general is an important personality characteristic and ought to be investigated as to how it relates to perceived personality trait relationships.[13] Also, individual differences in the use of the evaluative as related to a number of the outside variables included in the study are of interest (e.g., social desirability, asquiescence, etc.). To this end the Interpersonal Rating Scale (IRS) was constructed.

A number of bipolar adjectives have been found to have large factor loadings on an evaluative factor in factor analytic experiments. It was decided to search the literature for a number of evaluative

[13]Personal communication.

adjectives to be included as bipolar adjectives on a semantic differential scale. On the basis of such a search twenty-five bipolar adjectives were selected.[14] Even a cursory examination will verify for the reader their high loading on an evaluative factor. These twenty-five bipolar adjectives were then assigned to the scale at random both as to position in the Interpersonal Rating Scale and as to whether the positively evaluative or negatively evaluative adjective occurrred to the left. The only restriction was that there were to be approximately an equal number of bipolars with the positively evaluative adjective to the left as with the negatively evaluative adjective to the left. The latter procedure was employed to curtail blind marking and response sets. In the IRS twelve of the twenty-five scales have the positively evaluative scale to the left.

In order to elicit a general evaluative response from the examinees, independent of the particular concept being rated, at least three alternatives are possible, (a) obtain ratings on a rather large representative sampling of interpersonal concepts, (b) obtain ratings on a rather large random sampling of the population of interpersonal concepts, and (c) obtain a single rating on a general concept embodying a collection of a number of interpersonal concepts. Although it may be least accurate, the third alternative is certainly the most economical. It was decided to rate two general concepts, "The Average Person" and "People as a Whole." These concepts were to be rated on the twenty-five bipolar traits each on an eight-point scale with the four points of each

[14] A list of the evaluative scales in the order that they appear in the Interpersonal Rating Scale and with the positively evaluative adjective appearing always to the left is presented in Appendix O.

scale on each side being "extremely," "considerably," "moderately," and "more _____ than _____." The neutral response was not permitted; the examinees were forced to make a decision one way or the other. Each scale for each bipolar adjective was numbered one through eight inclusive. The larger the number the closer the particular scale was to the highly evaluative adjective. For each of the two concepts the numerical values for each of the scales was summed to get a total evaluative score. The total evaluative score thus had a possible range of 25 to 200. The total evaluative score for "The Average Person" concept was symbolized E_a, and the total evaluative score for "People as a Whole" concept was symbolized E_w.

The two concepts are sufficiently close that some subjects considered them to be equivalent. However, more analytical subjects distinguished some subjective differences between them. At any rate the intercorrelation between E_a and E_w probably represents a lower bound to the reliability of each of the separate ratings of the two concepts. The correlation between E_a and E_w with an $N = 262$ was found to be .78.

Chapter IV

DATA COLLECTION AND ANALYSIS

Subjects

The subjects were drawn from a subject pool consisting of undergraduate students enrolled in introductory psychology at the University of Illinois. The Illinois psychology department requires introductory psychology students to participate in experiments for course credit. The only restriction on the sample was that there be approximately the same number of males and females.

Data Collection

The test battery consisting of the measuring instruments described in the previous chapter was administered to the subjects during two experimental sessions. To maximize the number of subjects obtained, alternative sessions were scheduled for the following day for both the first and second session. This permitted the contact of subjects who either forgot about or were unable to attend the initial session for either or both of the first and the second sessions. The sessions were approximately one and a half hours in length and were held in the evening. The time interval between the first and second session was one week.

The number of subjects attending the two testing sessions is given in Table 6. The number of subjects who attended the first group session was 269, of these, 241 subjects attended and ostensibly completed the second group session. Those not in attendance at either the initial or alternative second group session were contacted personally and of these twenty-four were tested. However, two males and one female were missing

responses on parts of the tests resulting in a total of 262 subjects on whom the analysis was completed.

Table 6

Number of Subjects Attending the Two Testing Sessions

	First Session Group	Second Session Group	Second Session Individual	Total
Males	133	119	11	130
Females	136	122	13	135
Total	269	241	24	265*

*Three of these subjects, two males and one female, failed to complete all of the tests thus reducing the sample size to 262 for the analysis.

Eight measuring instruments were administered. The measuring instruments that were administered during the first and second sessions are given in their order of administration in Table 7. The Trait Similarity Rating Scales required a considerable amount of concentration and willingness on the part of the subjects. Their administration was preceeded by a shorter, easier instrument. It was felt that this would involve them in the experiment and still be sufficiently close to the beginning of the session so that effects of boredom and fatigue would be minimized. To further induce proper attitudes of involvement and cooperation in the subjects throughout the testing sessions, the chairman of the experimenter's thesis committee, Dr. Ledyard R Tucker, kindly concented to explain the general nature of the research and to introduce the experimenter.[15]

[15]Dr. Tucker appeared and assisted at all of the group testing sessions. I am deeply indebted and grateful to him and to the others who assisted in those sessions for their help.

Although all of the test instruments were constructed with instructions such that they could be self-administering, the administration procedure adopted was to ask the subjects to "read the instructions silently while I read them aloud." In this manner a more complete standardization in the administration resulted than would have been true otherwise. The possibility that subjects would either misinterpret or ignore the instructions was reduced considerably. There were always at least three people assisting in the administration during the group sessions. This facilitated the answering of questions, replacing broken pencils, stapling separated booklets, replacing missing pages, and the smooth transition from one measuring instrument to another. Also it was found that the separate and characteristic colors of paper on which the instruction sheet and the appropriate answer sheet of the different measuring instruments were printed was of considerable aid in distributing them, collecting them, and keeping them separate.

Table 7

The Order of Administration of the Measuring Instruments During the Two Sessions

Session	Measuring Instruments and their Order of Administration
First	1. Biographical Data Sheet (BDS) 2. Trait Similarity Rating Scale - Form A (TSRS-A) 3. Personality Inventory (PI)
Second	1. Public Opinion Questionnaire (POQ) 2. Trait Similarity Rating Scale - Form B (TSRS-B) 3. Estimation Questionnaire (EQ) 4. Biographical Inventory (BI) 5. Interpersonal Rating Scale (IRS)

In the administration the subjects were assured that they would have ample time to finish all of the instruments sometime during the session. However, in order to guarantee that all of the instruments would get administered and to reduce waiting and disorder on the part of the subjects, after the large majority of examinees finished a particular instrument, the answer sheets and test booklets were collected separately from those who had finished them. The instructions that were given were in effect that, "we realize that there are wide individual differences in the rate with which people respond to these instruments. We are interested in how conscientiously people respond to them and not how fast. However, since most people have finished, we are going to ask those of you who have who have finished to pass separately to the isles your answer sheets and test booklets for the (name of instrument), that's the one that is (color). Will those of you who have not finished please set yours aside; you will have an opportunity to finish it later." During the first session the majority of subjects completed the BDS in fifteen minutes, the TSRS-A in forty minutes, and the PI in thirty minutes. In the second session the approximate times for the majority of subjects for each instrument were as follows: the POQ, fifteen minutes; the TSRS-B, forty minutes; the EQ, twenty minutes; the BI, five minutes; and the IRS, five minutes. All subjects were able to complete all of the instruments during the testing sessions.

In addition to the data collected during the two testing sessions, Kuder Preference Record and SCAT (School and College Ability Test) scores were obtained from the University Testing Bureau. These measures are obtained from all freshman students entering the University of Illinois

either the summer prior to or during their freshman year. Whenever they were available scores were obtained on the ten major interest areas--outdoor, mechanical, computational, scientific, persuasive, artistic, literary, musical, social service, and clerical--of the Kuder, and for linguistic, quantitative, and total on the SCAT. However, since there were a large number of students who transfered to the University after their freshman year, their scores were not available. Another source of partial data was the Biographical Data Sheet. A number of people failed to include their mother's age, father's age, and father's occupation either because their parents were deceased or because they did not know the answer. The number of subjects on whom there was complete data--including the Kuder, SCAT, and the three biographical variables just mentioned--was 181 as compared to the total sample of 262 who had complete data when the variables mentioned above were excluded. The sample of reduced size will be referred to as the "truncated sample." And the total sample will be called the "total" or "augmented" sample.

Scoring and Coding of the Data

The scoring or coding of the BDS was discussed in the chapter on "The Measuring Instruments." Some of the variables in the BDS were then dropped from further analysis for the following reasons: (a) partial data--so many subjects failed to respond to them that their inclusion would have drastically reduced the size of the "truncated sample," (b) invariance--all or virtually all subjects gave identical responses, and (c) marginal gains--the extensiveness and difficulty of the analysis implied by their inclusion would have extended well beyond their contribution to the research. Grade point average and mother's occupation were

dropped from further analysis principally because of the first reason. Most mothers were housewives, a category that is not amenable to a socioeconomic rating on Warner's scale (Warner, Meeker, and Ells, 1949). In addition, many of the subjects failed to list a grade point average; probably because many of them were first quarter freshmen and did not have one as yet. Virtually all subjects indicated that they were "active" in their religions, that they had "excellent" health, and that they had "no" handicaps. These variables were dropped from the analysis because of the second reason.

Two classification variables were excluded from further analysis because of the third reason listed above. Major and religion were categorized and coded; however, the appropriate analysis called for was a multivariate analysis of variance for a single classification (cf. Jones, 1960). The analysis permits the statistical test of significance of differences between mean vectors for the classification variable. It also (when there is a single-classification variable) determines the corresponding discriminant function which gives an understanding of the origin of the differences in the pre-established groups. One such analysis would be required for each classification. While the results of such an analysis would be of interest, they are sufficiently peripheral to the major problem of the research that the analysis hardly seems justified in terms of its difficulty and the time required to conduct it. The analysis involves getting characteristic roots and vectors from mean products matrices obtained from mean vectors and involves considerable data preparation and handling even with modern data processing machines and computers. Therefore, this analysis will be deferred to a subsequent research program.

Outside of the BDS, the other scores discussed in the third chapter were obtained from the other measuring instruments with the use of scoring stencils applied to the answer sheets.

The ratings on the TSRS were treated differently. The ratings for each of the 300 scales for both Form A and Form B for all 265 subjects (159,000 ratings) were keypunched and verified on IBM cards. In the interest of ease and economy the numerical scale values were recoded when they were punched onto cards. The IBM card values corresponding to the TSRS numerical scale values are shown in Table 8. The scale values punched into IBM cards were subsequently transformed to the scale with values from -3.5 to +3.5.

Table 8

IBM Card Values Corresponding to the TSRS Numerical Values*

TSRS Numerical Values	Intermediate IBM Card Values	Transformed Values
4	9	3.5
3	8	2.5
2	7	1.5
1	6	.5
-1	4	- .5
-2	3	-1.5
-3	2	-2.5
-4	1	-3.5

*For a definition of the corresponding scale values see Table 3.

The scores obtained from all the measuring instruments except the Public Opinion Questionnaire and the Personality Inventory were transfered for each subject to his Biographical Data Sheet in the special blanks

provided for it. The scores from these three sets of sheets were then keypunched and verified onto IBM cards. The second rating of "father's occupation" was punched onto a separate card as were the authoritarian content and acquiescence set scores obtained from Messick's (cf. Messick & Frederiksen, 1958) scoring formulas.

Each of the variables punched onto cards was coded with a variable number of the truncated sample and with a variable number for the total or augmented sample. The variable numbers assigned to the variables for the truncated sample are contained in Table 9. And the variable numbers assigned to the variables for the total sample are contained in Table 10.

Table 9

Variables and their Corresponding Numbers Included in the Truncated Correlational Analysis

Variable Number	Description of Variable
	BIOGRAPHICAL DATA SHEET - BIOGRAPHICAL VARIABLES
1	Age
2	Sex (1 = Male; 2 = Female)
3	Year in College (1 = Fr; 2 = Soph; 3 = Jr; 4 = Sr)
4	Size of Home Community (1 small . . . 6 large)
5	Father's Age
6	Father's Occupation, by first rater (7 low . . . 1 high)
7	Father's Education (1 low . . . 17 high)
8	Mother's Age
9	Mother's Education (1 low . . . 17 high)
10	Number of Brothers
11	Number of Older Brothers
12	Number of Younger Brothers
13	Number of Sisters
14	Number of Older Sisters
15	Number of Younger Sisters
16	Total Number of Brothers and Sisters
17	Warm-Cold Rating of Father (1 warm . . . 5 cold)
18	Warm-Cold Rating of Mother (1 warm . . . 5 cold)
19	Lenient-Strict Rating of Father (1 lenient . . . 5 strict)
20	Lenient-Strict Rating of Mother (1 lenient . . . 5 strict)

Table 9 Continued

Variable Number	Description of Variable
21	Father's Age minus Mother's Age
22	Father's Education minus Mother's Education
	KUDER PREFERENCE RECORD - INTEREST AREAS
23	Outdoor
24	Mechanical
25	Computational
26	Scientific
27	Persuasive
28	Artistic
29	Literary
30	Musical
31	Social Service
32	Clerical
	SCAT
33	Linguistic
34	Quantitative
35	Total
36	CATEGORY WIDTH SCALE
37	SOCIAL DESIRABILITY SCALE
	INTERPERSONAL RATING SCALE
38	Evaluative Rating of "The Average Person"
39	Evaluative Rating of "People as a Whole"
40	Father's Occupation, by second rater (7 low . . . 1 high)
	PUBLIC OPINION QUESTIONNAIRE
41	California F scale
42	Number of Agreement Ratings on "Positive California F scale"
43	Number of Agreement Ratings on "Negative California F scale"
44	Triandis' Acquiescence Response Set Measure
45	Tolerance-Intolerance of Ambiguity Scale
46	Authoritarian Content Score (C)
47	Acquiescence Response Set Score (S_1)
48	Acquiescence Response Set Score (S_2)
	PERSONALITY INVENTORY
49	Cycloid Disposition Scale (C)
50	Rhathymia Scale (R)

Table 9 Continued

Variable Number	Description of Variable
51	Thinking Introversion Scale (T)
52	Cooperativeness Scale (Co)
53	Extroversion Scale (E)
54	Neuroticism Scale (N)
55	FIRST POINT OF VIEW
56	SECOND POINT OF VIEW
57	THIRD POINT OF VIEW

Table 10

Variables and their Corresponding Numbers Included in the Total Correlational Analysis

Variable Number	Description of Variable
	BIOGRAPHICAL DATA SHEET - BIOGRAPHICAL VARIABLES
1	Age
2	Sex (1 = Males; 2 = Female)
3	Year in College (1 = Fr; 2 = Soph; 3 = Jr; 4 = Sr)
4	Size of Home Community (1 small . . . 6 large)
7	Father's Education (1 low . . . 17 high)
9	Mother's Education (1 low . . . 17 high)
10	Number of Brothers
11	Number of Older Brothers
12	Number of Younger Brothers
13	Number of Sisters
14	Number of Older Sisters
15	Number of Younger Sisters
16	Total Number of Brothers and Sisters
17	Warm-Cold Rating of Father (1 warm . . . 5 cold)
18	Warm-Cold Rating of Mother (1 warm . . . 5 cold)
19	Lenient-Strict Rating of Father (1 lenient . . . 5 strict)
20	Lenient-Strict Rating of Mother (1 lenient . . . 5 strict)
22	Father's Education minus Mother's Education

Table 10 Continued

Variable Number	Description of Variable
36	CATEGORY WIDTH SCALE
37	SOCIAL DESIRABILITY SCALE
	INTERPERSONAL RATING SCALE
38	Evaluative Rating of "The Average Person"
39	Evaluative Rating of "People as a Whole"
	PUBLIC OPINION QUESTIONNAIRE
41	California F Scale
42	Number of Agreement Ratings on "Positive California F scale"
43	Number of Agreement Ratings on "Negative California F scale"
44	Triandis' Acquiescence Response Set Measure
45	Tolerance-Intolerance of Ambiguity Scale
46	Authoritarian Content Score (C)
47	Acquiescence Response Set Score (S_1)
48	Acquiescence Response Set Score (S_2)
	PERSONALITY INVENTORY
49	Cycloid Disposition Scale (C)
50	Rhathymia Scale (R)
51	Thinking Introversion Scale (T)
52	Cooperativeness Scale (Co)
53	Extroversion Scale (E)
54	Neuroticism Scale (N)
55	FIRST POINT OF VIEW
56	SECOND POINT OF VIEW
57	THIRD POINT OF VIEW

Analysis

The analysis of the present research can be divided into roughly four principal parts or subanalyses. These four subanalyses are as follows:

1. Obtaining individual coefficients on the r largest dimensions which account for the observed ratings.
2. Obtaining composite item and individual coefficients and the development of reliability estimates of the coefficient alpha type for the composite dimensions obtained.
3. Determination of the structure of item relationships for each of the composite dimensions.
4. Obtaining correlations relating the individual coefficients obtained to individual's scores on a number of personality, ability, and sociological variables.

Together these subanalyses will attempt to determine reliable individual and item coefficients relating to individual differences in the way that subjects rate trait similarities, the relations that exist between traits corresponding to dimensions representing individual differences in ratings, and some determinants of individual differences in perceived personality trait relations represented by the obtained dimensions. Each of these topics will be considered separately. And they may be considered as phases in the analysis.

The analysis of individual differences in trait similarity ratings. The method developed by Tucker (Tucker & Messick, 1960) will provide the basis of the analysis of individual differences in ratings on the TSRS.[16] It provides "dimensions of variety among the individuals, and will yield measures of dissimilarity for pairs of stimuli for idealized individuals used to represent the dimensions obtained in the factor analysis." The analysis represented principally an application

[16]See Appendix P for an outline of the mathematics for the analysis of individual differences in trait similarity.

of the procedure developed by Eckart and Young (1936) for the approximation of one matrix by another of a lower rank, but with the important extension by Tucker embodied in the notion of "idealized individual" as described above. The idealized individual is represented by a dimension in the factor space resulting from a factor analysis of individuals.

In order to estimate the reliability of the dimensions obtained, it was considered desirable to develop Form B as well as Form A of the TSRS. Thus two parallel forms were developed, generating two independent sets of trait similarity ratings on which the analysis could be performed (i.e., two analyses were indicated). These data are considered to form two matrices, X_f, one for each form, with rows for stimulus pairs and columns for individuals.

However, since Illiac, the high speed digital computer at the University of Illinois which was to be used at a particular stage in the analysis (to be described later) had certain limitations, it was necessary to draw a subsample of fifty individuals from the total sample of 262 individuals to complete the initial steps in the analysis and then to mathematically extend the findings back to the total sample. The question then arose as to whether or not the dimensions obtained from the sample of fifty were representative of the total sample. That is, the particular subsample drawn might fortuitously affect the obtained dimensions. As a check on this possibility, two non-overlapping subsamples of fifty individuals were drawn at random from the total sample, Subsample I and Subsample II. At this point then there were two subsamples of individuals taking two forms of the TSRS. This results in four "submatrices," X_{fh}, of trait similarity ratings (i.e., Submatrix AI,

Submatrix AII, Submatrix BI, and Submatrix BII) which are amenable to analysis. The combination of TSRS form and subsample of individuals comprising each submatrix is indicated in Table 11. The analysis was performed four times, once for each submatrix. Thus, the original ratings on the two forms of the TSRS by the total sample of individuals forming two large matrices are sampled so that the actual analysis is conducted four times, once for each of two subsamples of fifty individuals on each of the two forms of the TSRS.

Table 11

The Four submatrices
Resulting from the Two Forms of the Trait Similarities Rating Scale
and the Two Subsamples of Individuals

	Subsample I	Subsample II
Trait Similarity Rating Scale Form A	Submatrix AI	Submatrix AII
Trait Similarity Rating Scale Form B	Submatrix BI	Submatrix BII

The analysis is related to Hotelling's (1933) principal components but differs in that raw scores rather than deviation scores are utilized. It is based on formulations by Eckart and Young (1936) and by Householder and Young (1938) for the approximation of one matrix by another of lower rank. The solution provides a least squares solution to the raw score matrix of ratings, X_{fh}, by a matrix of approximation, $\hat{X}_{fhr}$, based on r

factors. The computation procedure involves the determination of the characteristic roots and vectors for the matrix of sums of squares and cross products of columns of the submatrix (i.e., of $P_{fh} = X_{fh}'X_{fh}$). The r largest and significant characteristic roots and their corresponding characteristic vectors are used to obtain a matrix A_{fhr} of individual coefficients on the r principal axes, and a matrix Y_{fr} of item coefficients on the r principal axes. The characteristic roots of P_{fh} are, in the terminology of Tucker (1960), the squares of the principal roots of X_{fh}. Algebraic procedures were used in their derivation such that the postmultiplication of Y_{fr} by A_{fhr} yields the least squares approximation $\hat{X}_{fhr}$ (i.e., $\hat{X}_{fhr} = Y_{fr} A_{fhr}$) and such that the elements of A_{fhr} are rescaled to render their size independent of the size of the sample on which the analysis was performed. After rescaling, the mean square of the individual coefficients on each principal axes is equal to unity irrespective of number of individuals included in the sample.

A mathematical development by Dr. Ledyard R Tucker[17] based on a development by Dwyer (1937) permits the extension to the matrix $(A_r)_{fh}$ of individual coefficients on the r principal axes for the total sample of individuals. And $(A_r)_{fh}$ is such that $\hat{X}_{fr} = Y_{fr} (A_r)_{fh}$.

A check on the goodness of the approximation to the original ratings by $\hat{X}_{fhr}$ and $\hat{X}_{fr}$ resulting from the inclusion of r dimensions and from the extension to $(A_r)_{fh}$ from A_{fhr} can be made by an examination of the matrices containing the errors of approximation. They are defined as follows:

$$E_{fhr} = Y_{fh} - \hat{X}_{fhr} \quad \text{and} \quad E_{fr} = X_f - \hat{X}_{fr} \quad .$$

[17]Personal communication.

Inclusion of too few dimensions should lead to a generally high level of error approximation. However, the extension of individual coefficients from a submatrix to the total sample of individuals should have a differential effect such that the errors of approximation for the individuals comprising the submatrix from which the analysis was generated would be smaller than the errors of approximation for the remaining individuals including those in the other sample of fifty individuals on whom the analysis was not generated. To shed some light on the latter point, root mean squared errors over items for individuals in the sample of fifty individuals on whom the analysis was generated and for the fifty individuals in the sample on whom the analysis was not generated were obtained. In addition, the intercorrelations between the root mean squared errors obtained from the analysis of the four submatrices for individuals in Sample I and for individuals in Sample II should indicate the extent of lack of fit between individuals on whom an analysis was generated and individuals on whom an analysis was not generated.

The method of analysis, however, does not lead to unique definitions of the obtained factors in the factor spaces. That is A_{fhr}, $(A_r)_{fh}$, and Y_{fr} are not unique. Premultiplication of the matrices of individual coefficients by any non-singular r x r matrix, W_r, produces matrices of individual coefficients on transformed axes. These transformed matrices may be sumbolized B_{fhr} and $(B_r)_{fh}$, respectively. A corresponding transformation of the matrix of item coefficients effected by the postmultiplication of Y_{fr} by the inverse of the transformation matrix, W_r^{-1}, yields item coefficients on the transformed axes. The transformation matrix does not have the restriction that the mean square

of the transformed individual coefficients on each transformed axis is equal to unity. The matrix containing these transformed coefficients may be symbolized Z_{fr}. It is easily seen by the following equations that the mathematical procedures utilized are unique only within a transformation.

$$\hat{X}_{fhr} = Z_{fr}B_{fhr} = Y_{fr}W_r^{-1}W_rA_{fhr} = Y_{fr}A_{fhr}$$

$$\hat{X}_{fr} = Z_{fr}(B_r)_{fh} = Y_{fr}W_r^{-1}W_r(A_r)_{fh} = Y_{fr}(A_r)_{fh}$$

The multiplication by the transformation matrix corresponds to the rotation of axes in regular factor analysis. For the purposes of subsequent analyses it is sufficient at this point to have obtained coefficients for individuals on the r most significant dimensions for each submatrix analyzed.

The determination of "the r most significant dimensions" has been alluded to previously and needs some clarification. This can best be approached by considering some of the sums of squares properties of the system. They will be stated without proof. The sums of squares of the observed raw scores, $X_{f(jk)i}$, is equal to the sum of squares of all principal roots, and the sum of squares of the approximated raw scores, $\hat{x}_{f(jk)i}$, is equal to the sum of squares of the first r principal roots. The sum of squares of the errors of approximation, $e_{f(jk)i}$, is equal to the sum of squares of the principal roots not included in forming the approximation. Thus the sum of squares of the observed raw scores can be analyzed into independent, additive portions--the sum of squares of approximated raw scores and the sum of squares of errors of approximation to the raw scores. Thus the sum of squares of errors corresponding to the successive extraction of the first 1 to r factors can be given by the

cummulative sum of the squared principal roots following the principal roots corresponding to the factors extracted (cf. Table 22). Tucker (1960) has suggested a procedure for "determining the number of factors to be used" that is based upon the above sum of squares properties.

Mean square ratios similar to variance ratios used in analysis of variance are obtained. The mean square for each factor is given by the principal root squared for that factor divided by the degrees of freedom assignable to that factor, $\sqrt{}_m^2/f_m$. The degrees of freedom for each factor is given by

$$f_m = (N - m) + (n-m) + 1$$
$$= N + n + 1 - 2m$$
$$= f_{(m-1)} - 2$$

Where m is the number of the particular factor, n is the number of items, and N is the number of individuals. The mean square for the errors of approximation after m factors is given by the sum of squares of errors of approximation divided by the degrees of freedom for the errors of approximation after m factors, S_m/F_m. The degrees of freedom for the errors of approximation after m factors is given by

$$F_m = (N - m)(n - m)$$
$$= F_{(m-1)} - f_m$$

And the mean square ratio, R_m, for factor m is given by

$$R_m = \sqrt{}_m^2 F_m / S_m f_m$$

Tucker (1960) has indicated that these mean square ratios "are not distributed by the F ratio used in the analysis of variance. They seem to be slightly biased toward higher values." The findings of the present study corroborate these findings and indicate that even for a rather large sample the approximation of the F distribution is not good. Thus,

in the absence of a theoretical distribution, it is impossible to state definite values corresponding to given confidence levels, and we can hope with Tucker (1960) that "developments in mathematical statistics will supply the required knowledge at some future time." For the time being reliance will have to be placed on an inspection of the relative size of the mean square ratios after each factor has been extracted.

Obtaining for composite factors coefficients alpha and item and individual coefficients. It has been stated previously that the primary purpose of the first step in the analysis was the determination of individual coefficients on the r most significant dimensions or factors for each submatrix. Procedures have been described for obtaining these data. Now, these data may be combined into a single matrix A* which is a 4r x 262 matrix formed by joining the four r x 262 $(A_r)_{fh}$ matrices together.

$$A^* = \begin{bmatrix} (A_r)_{AI} \\ (A_r)_{AII} \\ (A_r)_{BI} \\ (A_r)_{BII} \end{bmatrix}$$

Since, as has been pointed out previously, the components in each $(A_r)_{fh}$ may be transformed, the question arises as to how these transformations may be defined most advantageously. The answer to the question is obtained by a procedure suggested by Dr. Ledyard R Tucker,[18] based on the procedure for obtaining the usual coefficient alpha (cf. Cronbach, 1951), which determines transformations such that (a) composite factors are obtained and (b) maximum values of coefficient alpha are obtained for the resultant composite factors. Each composite factor is taken to

[18] Personal communication.

be a sum of transformed components, one such component being taken for each $(A_r)_{fh}$. The procedure thus effects a reduction of the number of groups or sets of individual coefficients for each individual from four to one. Moreover, the number of composite individual coefficients q within the single resultant set may be less than the r number of coefficients in each of the original sets. There is a composite individual coefficient on each of the q reliable composite factors obtained. Mathematical notes on the procedure are given in Appendix Q.

The coefficients of each individual on each dimension in A* may be transformed to deviation scores. And a weighted sum of these deviation scores within a group or section in A* is the equivalent of an item in the usual derivation of coefficient alpha. In this case there are p sets of weights which yield p different weighted sums of individual coefficients. The pth weighted sum of individual coefficients are in turn summed over all groups fh. This total sum is like a total score formed by summing item scores in usual test scoring. However, in this instance there are p total scores, one for each set of p weights. Variances for each pth weighted sum can be obtained. This is amenable to obtaining a coefficient alpha, α_p, for each of the p set of weights except for one important consideration and that is that the sets of weights are unknown. However, there is a method whereby these unknown weights may be obtained. It is clear that in order to maximise α_p the ratio of the variance of the sums of the pth weighted sum of deviation scores over all groups to the sum of the variances of the pth weighted sum of deviation scores over all groups, ϕ_p, must be at a maximum. The maximum of ϕ_p is obtained through the utilisation of differential calculus. The result is that

the general equation for all p weights can be expressed in the matrix equation $(C-\phi C^*)W = 0$. The matrix C is the matrix of covariances between all of the principal axes in A*, ϕ is a diagonal matrix containing the ϕ_p's in the diagonal, C* is a matrix containing covariances between the principal axes with each group for each group but containing zero elements elsewhere, and W is a matrix of the p weight vectors to be applied to A*. This equation is similar to the characteristic value problem and is the characteristic value problem when $C^* = I$. However, in this case $C^* \neq I$. An Illiac program is available for the solution of the equation $(C - \phi C^*)W = 0$; however, it is restricted to matrices of order less than the order of C and C*. However, the equation above can be converted into the characteristic value problem, and solved such that the equation to be solved becomes $(T'CT - \phi I)T^{-1}W = (B - \phi I)V = 0$. The q largest α_p are then obtained from the q largest ϕ_p. The relation between α_p and ϕ_p is expressed by the following equation:

$$\alpha_p = \frac{n}{n-1}\left[1 - \frac{1}{\phi_p}\right]$$

And the corresponding q sets of weights are the first q columns in matrix W obtained from the equation $W = TV$. These columns constitute a matrix W* which when transposed and postmultiplied by A* yields a q x 262 matrix containing composite individual coefficients on the qth most reliable axes (i.e., $A_c = W^{*\prime}A^*$). The location in the composite factor space of the obtained principal axes are not unique, however, and are probably not the most psychologically meaningful. The particular transformation matrix, T_{12}, which determines the directions that the principal axes or dimensions will go in the composite factor space resulting from

the factor analysis of individuals will be determined by graphic rotation based on criteria similar to simple structure. The two matrices of item coefficients on the rotated composite dimensions, $\hat{Z}_{cf}$, one for each form of the TSRS, are obtained by using a pseudo-inversion technique suggested by Dr. Ledyard R Tucker.[19]

The structure of item relationships for each of the composite dimensions. Three matrices of particular interest have thus far been obtained: one matrix for each form of the TSRS containing item coefficients, $\hat{Z}_{cA}$, and $\hat{Z}_{cB}$, and one matrix of individual coefficients, B_c'. These represent component matrices such that when B_c is premultiplied by either $\hat{Z}_{cA}$ or $\hat{Z}_{cB}$ the approximation matrices to the matrices containing the original ratings on the TSRS-A and the TSRS-B, respectively, are obtained. It is of interest to examine the perceptual space (i.e., the structure of item relationships) that is implied by the item coefficients on each of the dimensions in each of the Z_c matrices. This leads to an understanding of the perceived trait relationships for each of the points of view represented by each of the dimensions. The item coefficients (representing similarity-dissimilarity between trait-names on roughly the same scale as the transformed scale values) can be used to place the traits in a multidimensional space where the distance between traits is related to the size of the item coefficients. The item coefficients then lead to a determination of the number of factors implied by the structure of relationships between trait-names and to a specification of the respective factors by those trait-names that have large positive and negative loadings on them. Those trait-names that do not have large loadings on any of the factors are an admixture of the various factors.

[19]Personal communication.

Obtaining the multidimensional structuring of each of the points of view is rendered very difficult because of the incomplete data--not all pairs of trait-names were included in the TSRS. Each TSRS contains 300 pairs of trait-names for a combined total of 600 pairs of the total possible 1,225 pairs that exist for fifty trait-names. So a little less than half of the item coefficients as compared to complete paired comparisons data were obtained. By way of review, the reason for including incomplete overlapping of trait-names was to secure as broad as possible a sampling of trait-names so as to span the semantic space of individuals. Since the dimensions or points of view represented in the matrix of item coefficients for TSRS-A are identical to the dimensions in the matrix of item coefficients for TSRS-B, item coefficients on corresponding dimension can be combined to produce 600 of the possible 1,225 item coefficients of similarity-disimilarity for a given point of view. These coefficients can be placed in a 50 x 50 lower-triangular matrix where each cell represents a pair of trait-names.

Although it is possible that in the future a least squares solution may be worked out that is computationally feasible for deriving the structure of a person's perceptual space from incomplete data in the off diagonal cells, such a solution does not now exist. Thus there are no "quantitative" procedures such as factor analysis or the method of multidimensional successive intervals that can be applied to the item coefficients. However, it is entirely possible to develop "qualitative" procedures for developing dimensions and loadings of the various items on them. In fact, this is what is proposed for the present research. A type of factor matrix can be used. The factors in the matrix are derived

and defined by a set of trait-names that have large positive and negative coefficients between them. These trait-names are assigned large loadings on the factor (i.e., +++). Other trait-names having moderate coefficients relating to the factor defining trait-names but in a consistent fashion are assigned a moderate loading on the factor (i.e., ++). Trait-names that have small coefficients relating to trait-names loading on the factor, and are somewhat questionable because of missing data are assinged a small loading on the factor (i.e., +). And trait-names that are inconsistent in their relationship to trait-names loading on the factor or are extremely questionable because of the extent of missing data are assigned no loading on the factor. It is granted that this is a rather subjective and somewhat arbitrary procedure, but it is felt that a rather good representation of the structure of the trait relations for a particular point of view may be obtained in this way. One of the obvious outcomes of the procedure is that the obtained factors will more than likely be correlated or oblique. This was felt to be desirable considering the type of data analyzed.

The determinants of different points of view concerning trait relationships. The determination of the structure of item relationships for each of the different points of view concerning trait relationships helps define each point of view. Every person's point of view concerning trait relationships is an admixture of each of the derived points of view. The question is what are the personal characteristics of individuals exhibiting a large amount of a particular point of view? That is, what are the determinants of particular points of view? Do males exhibit more of one point of view than females? Are a person's interests, abilities, and personality characteristics related to the extent to which he perceives

traits in a certain way? And,if so, which interests, abilities, and personality traits? And how much? Do various sociological factors have a determining role? These are some of the questions that need to be answered.

To answer these questions correlations were obtained between the "outside" variables described in "The Measuring Instruments" and the individual coefficients on each of the dimensions describing different points of view. As has been heretofore discussed, two samples of individuals may be considered in a discussion of these "outside" variables. One sample, the truncated sample, has scores on each of the fifty-seven variables (N = 181); the other sample is the total sample and has scores on only thirty-nine of the variables (N = 262). The two samples resulted from a dilemma. A certain amount of missing data existed for the total sample. Therefore, to obtain correlations with all the variables available it was necessary to reduce the sample size somewhat by dropping those individuals who did not have scores on all of the variables. The problem is how well do the correlations obtained for the truncated sample, R_T, represent the complete sample? The logical argument is that they are representative. It is difficult to observe any selection factor operating which would have a systematic effect on any of the variables. As further evidence of their representativeness, correlations were obtained for comparison purposes for the total sample on those variables for which complete data existed for them, R_A. The variables included in the truncated sample and their variable numbers of those included in the total sample are given in Table 9 (pp. 88-90). And the variables and variable numbers of those included in the total sample are given in

Table 10 (pp. 90-91). Both correlational analyses were complete in the sense that the correlations between all possible pairs of variables included were obtained. Some of these intercorrelations in addition to the correlations involving the individual coefficients on the different points of view will also be of interest.

Chapter V

RESULTS AND INTERPRETATIONS

Results of the Analysis of Individual Differences in Trait Similarity Ratings

A summary of the principal successive steps in the first phase of the analysis and the matrices obtained is given in Table 12. It is impossible because of the large size of these matrices to report a listing of each. Actually, only a few of the matrices contain elements which are psychologically meaningful. Insofar as possible those matrices that are particularly meaningful will be reported.[20]

The important result of the first phase is the obtaining of the individual coefficients contained in $(A_r)_{fh}'$. A cursory examination of the magnitude of the characteristic roots obtained from P_{fh} for each of the four submatrices suggested that the first three for each were "significantly large" (see Tables 13, 14, 15, and 16 [pp. 110-113]). A preliminary plot of "size of characteristic root" against "number of characteristic root" on 3-cycle semi-logarithmic graph paper showed that the first three roots were above the best fitting straight line for the remaining roots. Further evidence that there were three and only three "significant" roots for each submatrix comes from the procedure developed by Tucker (1960) for obtaining mean square ratios. The results from utilizing

[20]Listings of the raw ratings from both the TSRS-A and the TSRS-B before the transformation of the ratings to the scale ranging from -3.5 to +3.5 which constitute matrices X_f and the sums of squares and sums of cross products constituting P_{fh} are filed with a copy of the thesis in the Department of Psychology at the University of Illinois.

Table 12

Matrices Obtained in the Successive Steps in the Analysis of Individual Differences in Trait Similarity Ratings for each of the Four Submatrices

Step	Matrix Obtained
1.*	X_f'
2.	X_{fh}'
3.	P_{fh}
4.	$W_{fhr}'50^{-1/2}$
5.	$\Gamma_{fr}^{-2}(50)$
6.	Y_{fr}
7.	H_{fr}
8.	A_{fhr}'
9.	$\hat{X}_{fhr}'$
10.	E_{fhr}'
11.	$RMSE_{fhr}'$
12.	$(A_r)'_{fh}$
13.	$\hat{X}_{fr}'$
14.	E_{fr}'
15.	$RMSE_{fr}'$

*This step was the same for Submatrices AI and AII and for Submatrices BI and BII, respectively.

those procedures on the factors represented by the first 20 characteristic roots are given in Tables 13, 14, 15, and 16. Clearly the first three mean square ratios obtained from each sample are above the level of the remaining values.

A moot question is whether the three factors obtained from each of the four samples would be essentially congruent following appropriate orthogonal transformations, that is, whether they are simply different solutions in a common factor space. (Results from the second phase of the analysis are relevant to that question.) It was felt that by doubling the apparent number of three significant factors obtained from each submatrix to six and retaining the first six factors for the remainder of the analysis that there would be sufficient overdetermination to guarantee the retention of the common factor space. Therefore, the first phase of the analysis was completed with six factors (i.e., with $r = 6$). A coefficient matrix H_{fr} was computed which permitted individual coefficients to be obtained for all 262 individuals on the six factors of each submatrix $(A_r)'_{fh}$ as well as for the 50 individuals comprising each submatrix A_{fhr}'. Premultiplication of the transpose of the Y_{fr} matrix of item coefficients for each submatrix successively by A_{fhr}' and by $(A_r)'_{fh}$ yielded the six-dimensional least squares approximation matrices $\hat{X}_{fhr}'$ and $\hat{X}_{fr}'$, respectively. Subtracting the approximation matrices from the original raw score matrices gave two errors of approximation matrices, E_{fhr}' and E_{fr}'. Two salient questions arise concerning these latter two matrices. The first is how well did the model fit the individuals in general, that is, what are the approximation errors like in general? And second, how well did the model fit the individuals not originally

Table 13

Mean Square Ratios Corresponding to Characteristic Roots for Submatrix AI

Factor m	Characteristic Roots γ_m^2	Residual Sum of Squares	Degrees of Freedom f_m	F_m	Mean Square Ratio R_{ms}
0	-------	57256.0	---	15000	-----
1	22104.3	35151.7	349	14651	26.40*
2	4722.8	30428.9	347	14304	6.40*
3	1966.6	28462.3	345	13959	2.80*
4	1485.6	26976.7	343	13616	2.19
5	1420.7	25556.0	341	13275	2.16
6	1383.2	24172.8	339	12936	2.18
7	1282.0	22890.8	337	12599	2.09
8	1267.4	21623.4	335	12264	2.15
9	1194.1	20429.3	333	11931	2.09
10	1065.7	19363.6	331	11600	1.93
11	1040.7	18322.9	329	11271	1.95
12	970.3	17352.6	327	10944	1.87
13	914.6	16438.0	325	10619	1.82
14	880.1	15557.9	323	10296	1.80
15	843.5	14714.4	321	9975	1.78
16	808.4	13906.0	319	9656	1.76
17	800.5	13097.5	317	9339	1.80
18	750.3	12347.2	315	9024	1.74
19	733.3	11613.9	313	8711	1.76
20	720.5	10893.4	311	8400	1.79

*Interpreted as significantly large.

Table 14

Mean Square Ratios Corresponding to Characteristic Roots for Submatrix AII

Factor m	Characteristic Roots γ_m^2	Residual Sum of Squares	Degrees of Freedom f_m	F_m	Mean Square Ratio - R_{ms}
0	--------	58702.0	---	15000	-----
1	21044.8	37657.2	349	14651	23.46*
2	6686.6	30970.6	347	14304	8.90*
3	1923.7	29046.9	345	13959	2.68*
4	1606.9	27440.0	343	13616	2.32
5	1564.5	25875.5	341	13275	2.35
6	1430.5	24445.0	339	12936	2.23
7	1244.1	23200.9	337	12599	2.00
8	1202.5	21998.4	335	12264	2.00
9	1135.9	20862.5	333	11931	1.95
10	1002.8	19859.7	331	11600	1.77
11	966.2	18893.5	329	11271	1.75
12	938.1	17955.4	327	10944	1.75
13	897.6	17057.8	325	10619	1.72
14	858.7	16199.1	323	10296	1.69
15	850.3	15348.8	321	9975	1.72
16	822.2	14526.6	319	9656	1.71
17	773.5	13753.1	317	9339	1.66
18	731.0	13022.1	315	9024	1.61
19	711.2	12310.9	313	8711	1.61
20	708.6	11602.3	311	8400	1.65

*Interpreted as significantly large.

Table 15

Mean Square Ratios Corresponding to Characteristic Roots for Submatrix BI

Factor m	Characteristic Roots γ_m^2	Residual Sum of Squares	Degrees of Freedom f_m	F_m	Mean Square Ratio-R_{ms}
0	-------	52599.2	---	15000	------
1	20477.7	32121.5	349	14651	26.76*
2	6197.8	25923.7	347	14304	9.86*
3	1605.8	24317.9	345	13959	2.67*
4	1387.1	22930.8	343	13616	2.40
5	1263.5	21667.3	341	13275	2.27
6	1220.3	20447.0	339	12936	2.28
7	1122.8	19324.2	337	12599	2.17
8	1062.2	18262.0	335	12264	2.13
9	1022.5	17239.5	333	11931	2.13
10	1010.2	16229.3	331	11600	2.18
11	925.1	15304.2	329	11271	2.07
12	824.8	14479.4	327	10944	1.91
13	803.0	13676.4	325	10619	1.92
14	754.2	12922.2	323	10296	1.86
15	736.3	12185.9	321	9975	1.88
16	708.4	11477.5	319	9656	1.87
17	678.9	10798.6	317	9339	1.85
18	650.7	10147.9	315	9024	1.84
19	638.5	9509.4	313	8711	1.87
20	600.9	8908.5	311	8400	1.82

*Interpreted as significantly large.

Table 16

Mean Square Ratios Corresponding to Characteristic Roots for Submatrix BII

Factor m	Characteristic Roots γ_m^2	Residual Sum of Squares	Degrees of Freedom f_m	F_m	Mean Square Ratio-R_{ms}
0	-------	50204.0	---	15000	------
1	17930.8	32273.2	349	14651	23.32*
2	6086.3	26186.9	347	14304	9.58*
3	1648.8	24538.1	345	13959	2.72*
4	1370.6	23167.5	343	13616	2.35
5	1253.9	21913.6	341	13275	2.23
6	1172.4	20741.2	339	12936	2.16
7	1081.4	19659.8	337	12599	2.06
8	1070.2	18589.6	335	12264	2.11
9	1037.3	17552.3	333	11931	2.12
10	995.2	16557.1	331	11600	2.11
11	953.3	15603.8	329	11271	2.09
12	856.9	14746.9	327	10944	1.94
13	846.6	13900.3	325	10619	1.99
14	811.0	13089.3	323	10296	1.98
15	781.1	12308.2	321	9975	1.97
16	762.1	11546.1	319	9656	2.06
17	735.3	10810.8	317	9339	2.00
18	668.8	10142.0	315	9024	1.89
19	641.9	9500.1	313	8711	1.88
20	625.3	8874.8	311	8400	1.90

*Interpreted to be significantly large.

in the sample (to whom the individual coefficients were extended), that is, are the errors of approximation differentially larger for the individuals to whom the analysis in each sample was extended? The first question is related to how well the inclusion of six dimensions accounted for the original ratings. The second is related to how representative of the total sample each particular subsample was in generating the obtained factors. Some evidence in answer to these two questions can be obtained by examining the root mean squared error matrices, $RMSE_{fhr'}$ and $RMSE_{fr'}$. The entries in these matrices are the square roots of the mean squared errors of approximation for each individual. The root mean squared error matrix for the sample on whom the analysis was generated ($RMSE_{fhr'}$) is contained in the matrix for the total sample ($RMSE_{fr'}$). The total root mean squared error of approximation for all individuals and all items is a partial answer to the first question posed above. However, included in it are errors associated with question two. The second question receives partial clarification by an examination of the total root mean squared errors for the subsample of fifty individuals on whom each analysis was generated, h, as compared to both the other subsample of fifty individuals on whom the analysis was not generated, h', and the total sample of 262 individuals. These total root mean squared errors are contained in Table 17. In general the entries are slightly smaller for the subsamples on whom the analysis was generated than for the complimentary subsamples of individuals or for the group as a whole including both subsamples of individuals as well as the 162 other individuals. A comparison of the means of the entries in the three columns shows the mean of the first column to be .12 smaller than the mean of the second column and the mean

of the first column to be all smaller than the mean of the third column. Considering that the scale values have a range of 7.0, the differential errors of approximation and the overall level of approximation errors are relatively small. The size of the root mean squares of errors for individuals, however, does indicate that there is some degree of randomness, perhaps due to idiosyncratic individual differences, that is not being explained.

Table 17

Total Root Mean Squared Errors for the Subsample from which the Analysis was Generated, $RMSE_{fhr}$, for the Other Subsample, $RMSE_{fh'r}$, and for the Total Group, $RMSE_{fr}$

for Submatrices AI, AII, BI, and BII

Submatrix	$RMSE_{fhr}$	$RMSE_{fh'r}$	$RMSE_{fr}$
AI	1.2532	1.4512	1.3702
AII	1.2663	1.4137	1.3670
BI	1.1465	1.1398	1.2569
BII	1.1616	1.3062	1.2629
Means	1.2069	1.3277	1.3143

Additional clarification concerning the errors of approximation comes from the entries in Tables 18 and 19. The root mean squared errors for the fifty individuals comprising each subsample were taken from the $RMSE_{fr}$' for each of the four samples. This gave four indices for each individual in Subsample I and four indices for each individual in

Subsample II, two of which represent errors of approximation when the particular subsample was used to generate the individual coefficients for the total groups and two of which represent errors of approximation when the complimentary subsample was used. The relatively large correlations indicate that the accuracy of approximation of the original ratings of the individuals is somewhat independent with respect to which of the two subsamples was used to generate the analysis or which of the two forms of the TSRS was used. In fact the intercorrelations between samples having TSRS form in common rather than subsample I or II of individuals in common tend to be slightly higher. This means that the form of the TSRS on which the analysis was completed is more instrumental in determining how well the analysis would fit the various individuals than was the subsample on which the analysis was generated. The means and standard deviations of the root mean squared errors for each subsample in each submatrix are also given in Tables 18 and 19.

Table 18

Matrix of Intercorrelations, Means, and Standard Deviations of Root Mean Squared Errors Obtained in Submatrices AI, AII, BI, and BII for Individuals in Subsample I

	AI*	AII	BI*	BII	Means	Standard Deviations
AI*	1.00				1.2532	.2054
AII	.80	1.00			1.4137	.3158
BI*	.75	.64	1.00		1.1465	.2229
BII	.72	.78	.83	1.00	1.3062	.3405

*Submatrices in which this particular subsample was used to generate the individual coefficients for the total group.

Table 19

Matrix of Intercorrelations, Means, and Standard Deviations of Root Mean Squared Errors Obtained in Submatrices AI, AII, BI, and BII for Individuals in Subsample II

	AI	AII*	BI	BII*	Means	Standard Deviations
AI	1.00				1.4512	.2716
AII*	.51	1.00			1.2663	.1638
BI	.69	.66	1.00		1.3198	.2955
BII*	.40	.58	.66	1.00	1.1616	.1969

*Submatrices in which this particular subsample was used to generate the individual coefficients for the total group.

Results in Obtaining Coefficients Alpha and Composite Item and Individual Coefficients

At this point the first of four phases in the analysis has been completed. Individual coefficients have been obtained on six principal axes (three of which are considered to be significant) for the total group from each of the four submatrices. An examination of the errors of approximation has indicated that (a) the inclusion of six factors reasonably accounts for the original ratings and (b) the extension of individual coefficients from a subsample to the total group is reasonably accurate. The second phase of the analysis is concerned with determining (a) the extent of congruence that exists between the three significant factors from each sample (cf. Tucker, 1951), (b) composite individual coefficients obtained as a weighted sum of the twenty-four individual coefficients that were obtained for each individual in phase one, and (c) reliabilities for

each of the obtained composite dimensions. The expectation is that, if the three significant factors obtained from each sample are essentially congruent, then three sets of weights will be obtained which lead to three sets of composite individual coefficients which are highly reliable.

Matrices obtained in successive steps of the analysis (as described in Appendix Q and in "Data Collection and Analysis") are summarized in Table 20. As with the steps described in Table 11, associated with the first phase of the analysis, only the principal steps and matrices have been included in the interest of clarity and simplicity.

Table 20

Matrices Obtained in the Successive Steps in the Procedure for Obtaining Coefficients Alpha and Composite Individual Coefficients

Step	Matrix Obtained
1.	C
2.	C*
3.	T
4.	B
5.	ϕ
6.	V
7.	W
8.	W'*
9.	A*
10.	A_c'
11.	T_{12}
12.	B_c'
13.	Z_c

The variance-covariance matrix C for the twenty-four individual coefficients for each individual in the total sample contained in A* was computed on the IBM 1401 high speed digital computer at the University of Illinois. Since the output was in the form of a printed listing, the covariances had to be keypunched and verified into IBM cards. These entries were then transferred from card to perforated tape for both C and C* since the needed characteristic roots and vectors were obtainable only from the Illiac. The remaining steps as described in the previous chapter were then completed. C* was factored to obtain T, and B was obtained. The characteristic roots of B yielded ϕ directly, and the matrix of corresponding weights W was obtained from matrix V containing the characteristic vectors of B. An inspection of the ϕ_p's revealed a sharp reduction in their size. The first (and largest) six were converted to their corresponding coefficient alpha via the appropriate formula (see Appendix Q). These values and the composite factor to which they apply are given in Table 21. These values were considered to be adequate evidence that three and only three highly reliable factors existed. An examination of the weight vectors corresponding to the three largest reliabilities indicated that the three largest factors obtained from each submatrix were essentially congruent (see Table 22)(i.e., $q = 3$). Therefore, only these three weight vectors were retained and utilized in constructing the weight matrix $W^{*'}$ which when postmultiplied by A* yielded the matrix A_c containing three composite individual coefficients for each of the 262 individuals in the total sample. Matrix W* is contained in Table 22.

Matrix A_c, however, is not a unique solution (as indicated in Appendix Q). In order to move the axes from the arbitrary location

Table 21

The Six Largest Coefficients Alpha

Composite Factor Number p	Characteristic Roots ϕ_p	Coefficients Alpha α_p
1	3.645	.968
2	3.403	.942
3	2.886	.871
4	2.041	.680
5	1.724	.560
6	1.397	.379

determined by the analysis to positions useful in the interpretation of the factors, graphical rotation was employed (cf. Fruchter, 1954; Harman, 1960). The three plots representing the plots of each pair of orthogonal axes were made. Since the rotation is formally equivalent to the rotation of axes in regualr factor analysis, the principal of simple structure was utilized as a guide in the present rotation of axes in the individual coefficient space. An inspection of the three plots indicated that no rotation was necessary except for the plot of the first composite factor with the second. This pair needed to be rotated counterclockwise through an angle of approximately 11°. Also, since most of the points in the plot of the third composite factor with the second composite factor are to the left of the axis for the second composite factor, it was desirable to reflect the third composite factor so that the individual coefficients on that factor became positive rather than negative. This was accomplished by making the entry in the third row and column of the transformation

Table 22

The Matrix W*' Containing the Weights w_{pmg} for the Three Transformed Factors on the Six Principal Axes Contained in Each of the Four Groups

Group	Principal Axes	Transformed Factors 1	2	3
1	1	- .2083	-2.0528	.2132
	2	.4898	- .2231	- .0489
	3**	+ .0242	- .1322	+ .8141
	4**	- .0257	- .0537	+ .2229
	5	.0447	- .0890	.0245
	6	- .0247	.0042	- .1757
2	1	- .1125	-1.9567	.2734
	2**	+ .5875	- .1380	+ .0127
	3	- .0093	- .0420	.7509
	4	.0505	- .0672	.2774
	5	.0662	.0042	- .0131
	6**	- .0100	+ .0843	- .1177
3	1**	- .3239	-1.5993	+ .0684
	2	.4979	- .3982	.0353
	3	.0296	- .0372	.7226
	4	- .0257	.0646	.1281
	5	.0528	.0054	- .3782
	6	- .0263	.0126	- .1179
4	1	- .1285	-1.5907	.2407
	2	.5324	- .1972	.0918
	3	- .0306	.0460	.7456
	4	.0104	.0433	.0316
	5	- .0132	.0028	.0394
	6**	+ .0252	- .0178	- .2601

**The direction of a particular axis in factor space is arbitrarily determined by the computer. For convenience in the interpretation of weights, the signs of the weights for those principal axes marked with a double asterisk were assigned as though those principal axes had been reflected.

matrix a minus unity. (The orthogonal transformation matrix, T_{12}, is given in Table 23)

Table 23

Orthogonal Transformation Matrix, T_{12},

for Obtaining Individual Coefficients on Rotated Composite Axes

Principal Composite Factors	Rotated Composite Factors 1	2	3
1	.9824	-.1867	.0000
2	.1867	.9824	.0000
3	.0000	.0000	-1.0000

The transformation was effected by postmultiplying A_c' by T_{12} to obtain the transpose of the matrix containing individual coefficients on the transformed composite principal factors, B_c' (see Appendix Q). Since the rotation simply reflects the third composite factor, the individual coefficients on that factor were invariant with the transformation except for a reversal in sign. The transformation did, however, alter the individual coefficients on the first two composite factors. Plots of each of the three pairs of axes after rotation are given in Figures 1, 2, and 3. The three plots indicate the distribution of individual coefficients on each of the three factors as well as the location of individuals in the three dimensional factor space.

Having obtained the individual coefficients on the orthogonal composite principal axes, it is desirable to also obtain the 600 x 3

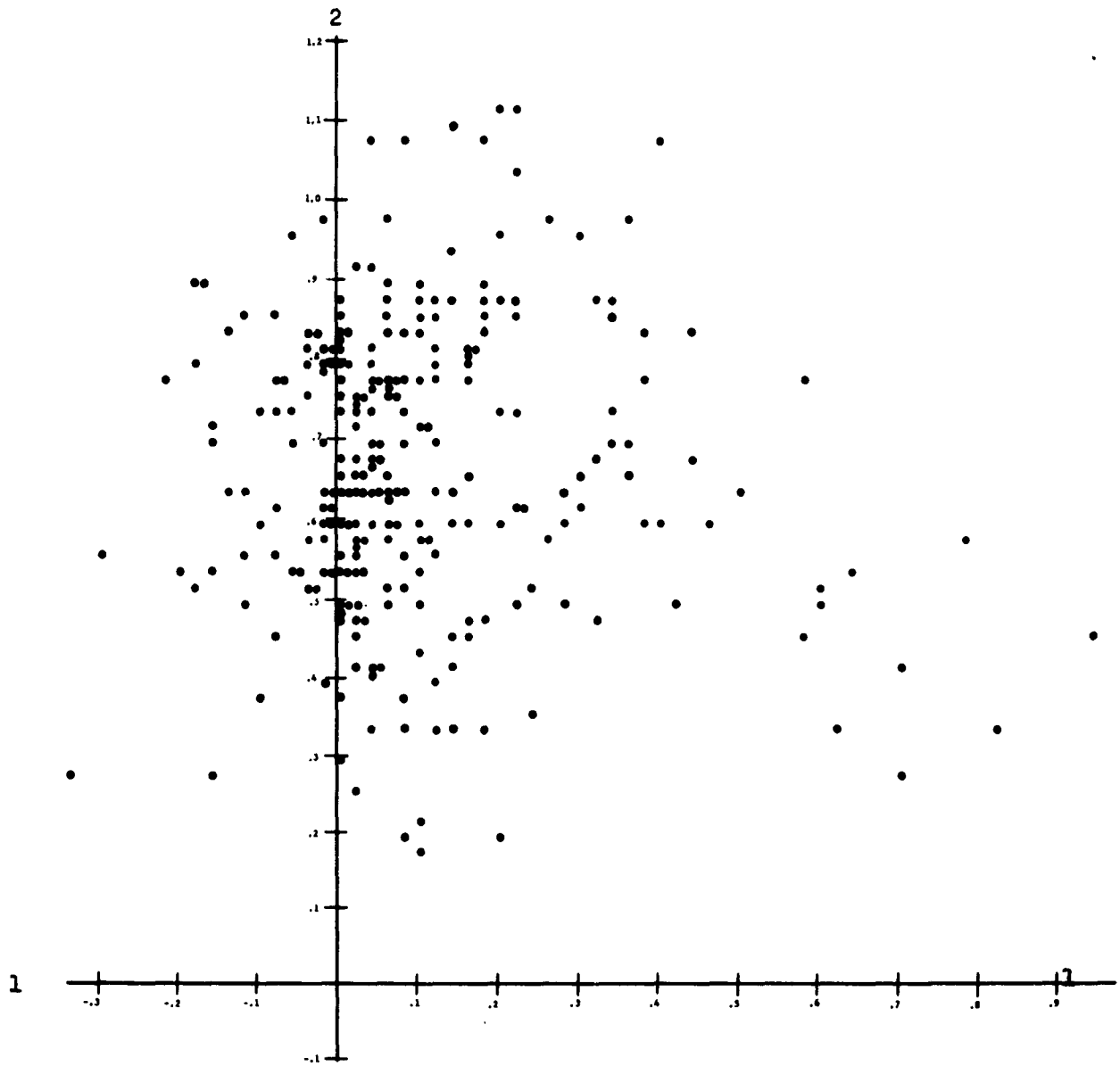


Figure 1 - Plot of individuals in the plane formed by composite factor one and composite factor two after orthogonal rotation by the graphical method.

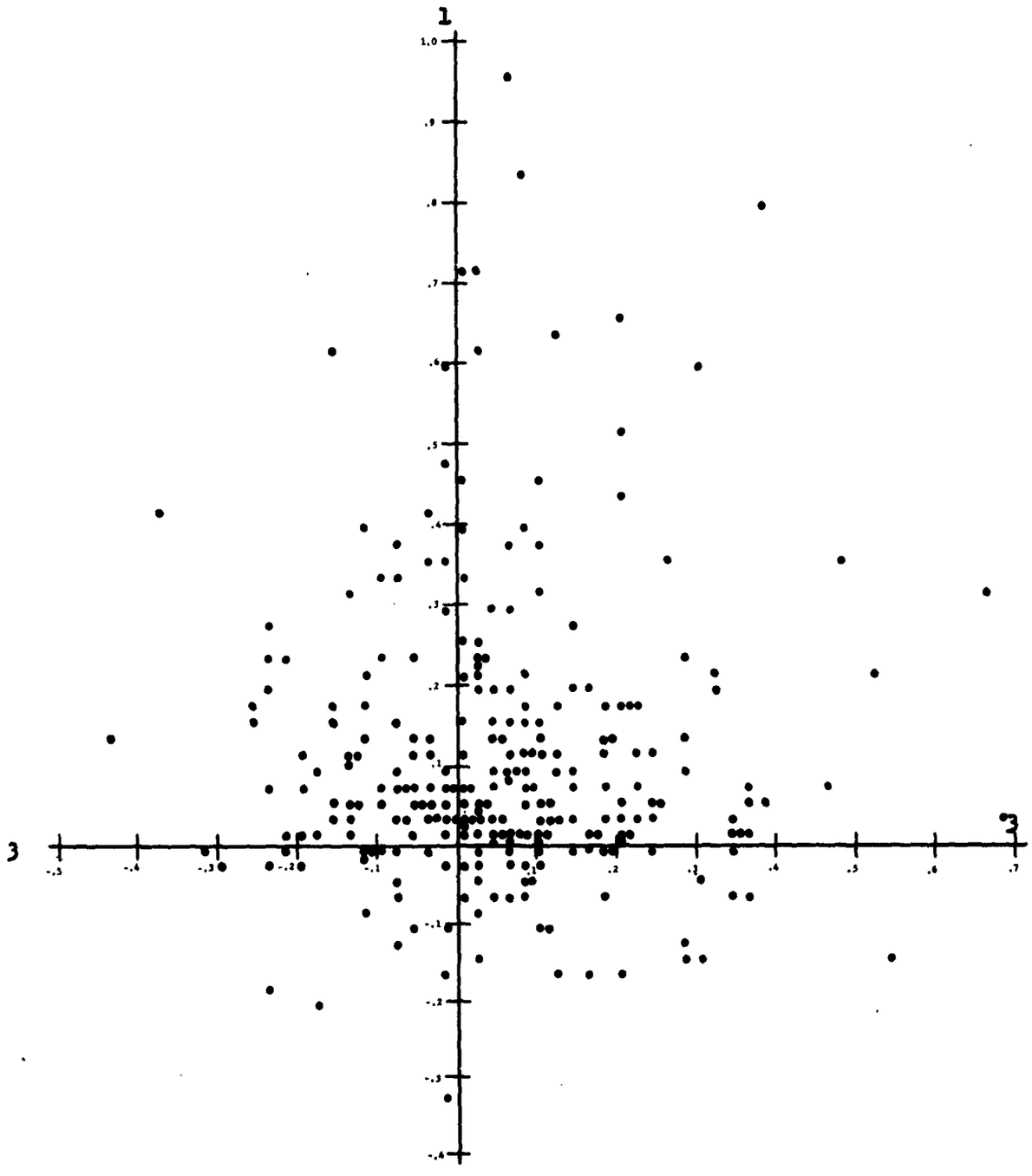


Figure 2 - Plot of individuals in the plane formed by composite factor one and composite factor three after orthogonal rotation by the graphical method.

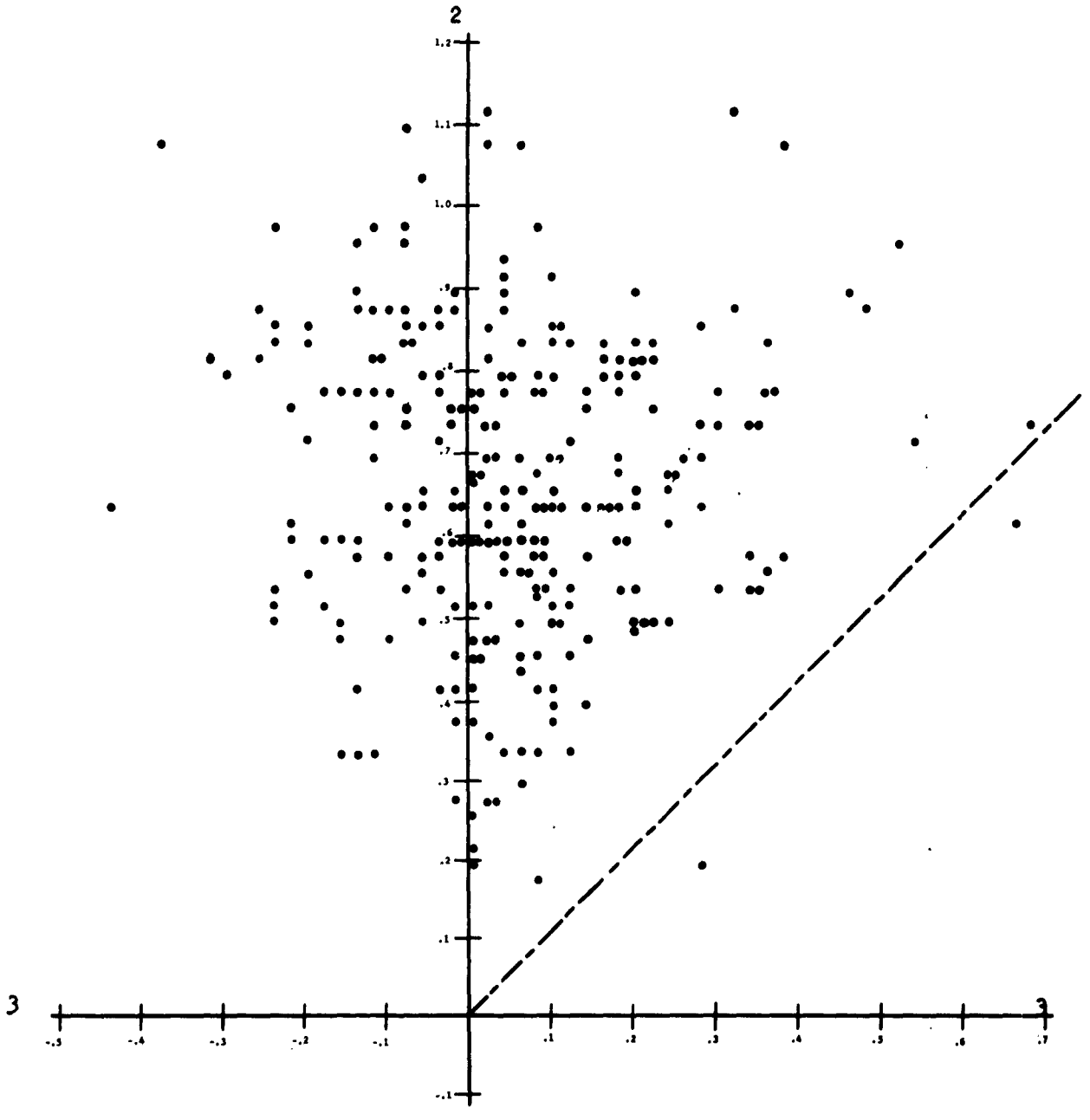


Figure 3 - Plot of individuals in the plane formed by composite factor two and composite factor three after orthogonal rotation by the graphical method.

matrix of item coefficients, Z_c, such that when it is postmultiplied by B_c, the supersectional matrix containing the two original rating matrices will be approximated. Hypothetically there is a Y_c matrix corresponding to the A_c matrix before the orthogonal transformation. If it were known the Z_c matrix could be obtained via the orthogonal transformation matrix. However, there was no provision in the analysis for obtaining the Y_c matrix. The W* matrix used to obtain A_c is inappropriate. Individual coefficients were obtained for all 262 subjects for each of the four submatrices analyzed and then the weight matrix was developed for getting a weighted sum of the twenty-four coefficients for each individual. This was not possible for the matrices of item coefficients, Y_r. In the first place they were not generalizable such that item coefficients for all 600 items could be obtained for each of the four submatrices. And in the second place, two submatrices developed item coefficients for the TSRS-A items and two submatrices developed item coefficients for the TSRS-B items. Thus W*', a 24 x 3 weight matrix, was inappropriate for obtaining the composite Y_c matrix. Two 12 x 3 matrices would have been necessary. The simplest procedure for obtaining the desired matrix of item coefficients would be to postmultiply the X matrix by the inverse of B_c. However, since B_c is not a square matrix it has no inverse. A pseudo-inversion technique is available whereby a square matrix is created by the product $B_c B_c'$ which does have an inverse. Proceeding in this fashion the 600 x 3 matrix of approximations to the item coefficients, $\hat{Z}_c$, was obtained.

Results Pertaining to the Meaning of the Rotated Composite Dimensions

The meaning of the three rotated composite dimensions comes from the consideration of three sources of information (a) the distribution of

individual coefficients on the three composite dimensions, (b) the intercorrelations of the individual coefficients with the scores for individuals on the "outside" variables (i.e., the determinants of the different points of view), and (c) the matrix of item coefficients $\hat{Z}_c$. Heretofore, the dimensions that resulted from the type of factor analysis performed over individuals have been referred to variously as dimensions, factors, principal axes, directions in factor space, idealized individuals, and points of view. The discussion in this section is directed toward obtaining a more precise understanding of the meaning of these dimensions.

The distribution of individual coefficients on the composite dimensions. Reference will be made to the plots showing the factor structures of individuals. Figures 1 (p. 123) and 3 (p. 125) indicate that every individual in the total sample obtained fairly large positive coefficients on composite factor two. Figure 2 (p. 124) shows that there is an approximate balance between positive and negative coefficients for individuals on composite factors one and three. It is also notable that while there are individuals with large positive coefficients on "two" and near zero coefficients on "one" and "three," that there are no individuals who have near zero coefficients on "two" and at the same time large coefficients on either "one" or "three."

It is instructive at this point to digress long enough to look at the formula for approximating the original trait similarity rating of a particular item by a particular individual from the item and individual coefficients. The formula for the present case of three composite factors is as follows:

$$\hat{r}_{f(jk)i} = \hat{z}_{f(jk)1}b_{1i} + \hat{z}_{f(jk)2}b_{2i} + \hat{z}_{f(jk)3}b_{3i} \quad .$$

The f subscript indicates that the set of s's correspond to the form of TSRS whose original ratings are being approximated. An observance of the b's shows that if the b's for a particular person have values on two dimensions that are near zero with the other one being fairly large, then the approximations of the original ratings will be primarily a result of the item coefficients for the items on that single dimension. That is, the item coefficients of the dimension would represent fairly well the ratings by the person. Theoretically, each dimension could be taken to represent some "idealized individual," "idealized" in the sense that the original ratings would result from unmixed or pure item coefficients on that particular dimension.

In reality, of course, virtually all subjects' trait similarity ratings represent an admixture of the item coefficients of the idealized individuals. Another way of looking at the dimensions in the present case since perceptions are being rated, is to consider them as different points of view held by individuals. This term is much the same as "idealized individual" but does not suggest as strongly that there is necessarily someone, somewhere who is a pure case. The present findings indicate that the second dimension represents an idealized individual; there are cases that come close to the "ideal." The first and third dimensions, on the other hand, are not approached by real people. The fact that the approximation to the original ratings of the subjects is a result of a relatively large positive amount of "two," plus smaller positive or negative amounts of "one" and "three," suggests that these latter two dimensions represent alterations or shifts from "two." Since this is the case, the terminology "points of view" will be used in preference to "idealized individual" when

referring to these latter two dimensions. This also necessitates a modification of the procedure described in the previous chapter. It was there suggested that the perceptual structures could be examined for each of the three dimensions. It will be profitable to examine the factor structure or the perceptual space for idealized individual number two; however, it is not meaningful to look at the structures for the first and third dimensions since these do not represent perceptual spaces by themselves. Figure 3 (p. 125) suggests that possibly there is a perceptual structure corresponding to the sum of dimensions two and three. (This results in an oblique factor at an angle of 45° with "two.") The direction in the factor space taken by the summation factor is shown in Figure 3 by a broken line. As a consequence there are actual individuals representing the resulting idealized individual. An understanding of the structure of item relationships for individuals who are represented by a certain amount of the second dimension plus an amount of shift resulting from the third dimension will come by examining, first, the perceptual space of the second idealized individual and, then, observing the shifts in trait relationships for individuals with a relatively high positive score on the third dimension.

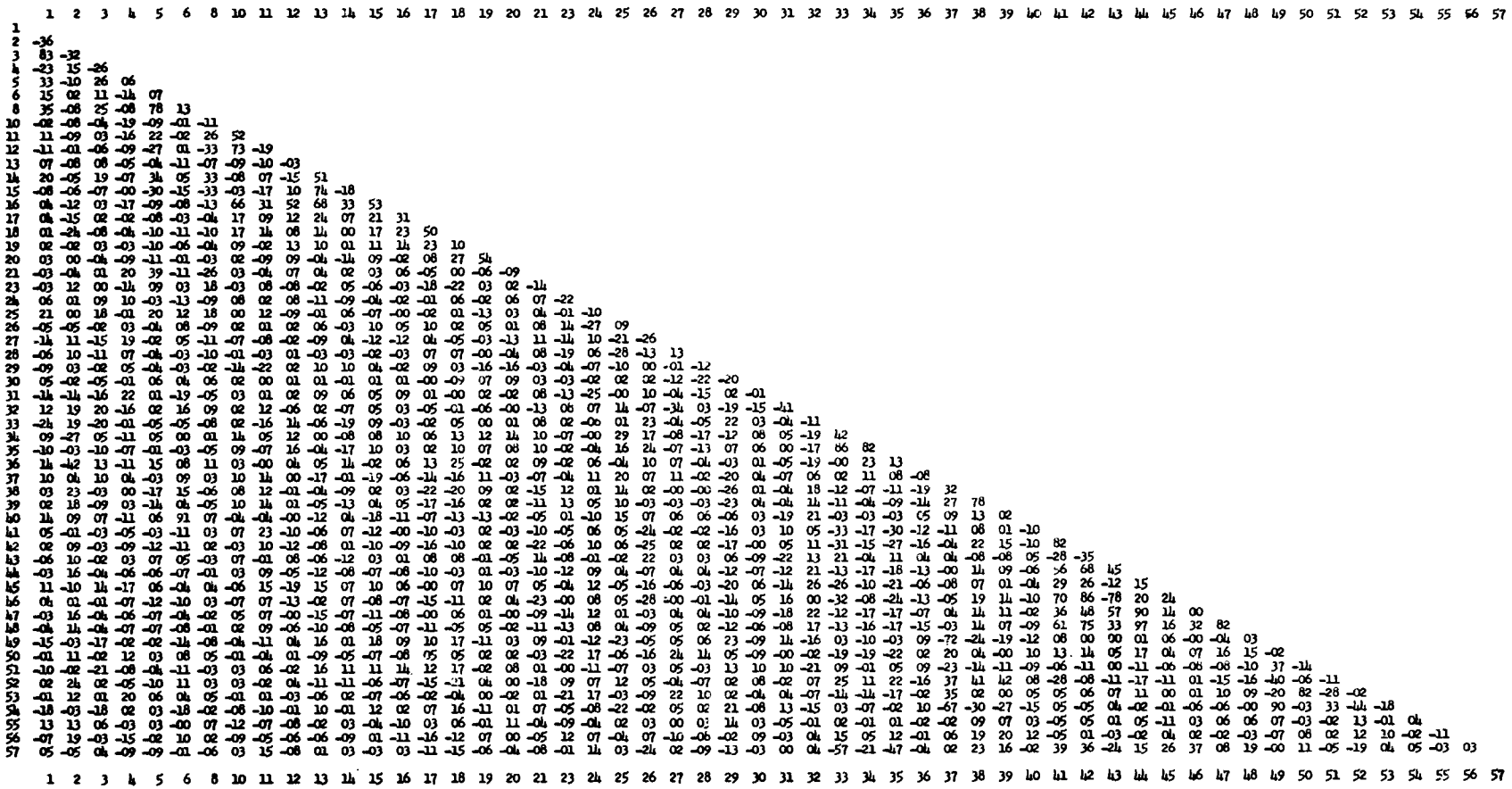
Also, an understanding of the nature of the alteration in point of view represented by the first dimension will be explicated through an examination of the item coefficients on that dimension as compared to the item coefficients on the second dimension.

Results relating to the determinants of different points of view concerning trait relationships. As an aid to the understanding of the nature of the points of view it is worthwhile at this juncture (before

getting into the structure of item relationships) to consider the second source of information relating to individual coefficients on the three points of view (i.e., the intercorrelations of the individual coefficients with the "outside" variables). The nature of these outside variables has been extensively dealt with in previous chapters. Also, an explanation and description of the two correlational analyses performed--one for the truncated sample and one for the total sample--has been given. The correlations resulting from these analyses are given in Tables 24 and 25, respectively. Descriptions of the variables corresponding to the variable numbers are given in Tables 9 (pp. 88-90) and 10 (pp. 90-91). The following three general classes of information are obtained from these correlations: (a) the extent to which the correlations obtained from the truncated sample represent the correlations obtained from the total sample, (b) the determinants of the three points of view, and (c) interrelationships between the outside variables themselves. The first two classes of information are relevant at this point and will be dealt with in this section; the third class will be considered in a separate section later.

The dilemma that arose because some of the subjects had incomplete data on some of the variables has already been discussed. Two samples were developed: the total sample which included all individuals on most of the variables and the truncated sample which included all of the variables for most of the individuals. Before getting into an interpretation of the intercorrelations, the question arises as to how well the correlations obtained on the truncated sample represent the correlations that would have been obtained for the total sample if they had had complete data. Another way of stating the problem is to ask whether or not the heterogeneity of

Table 24 - Matrix of Intercorrelations between the Variables Included in the Correlational Analysis for the Truncated Sample of Individuals* (Decimals Omitted)



*Correlations above .15 are significant at the .05 level, and correlations above .19 are significant at the .01 level.

Note: Truncated sample contains correlations between all 57 variables.

Table 25 - Matrix of Intercorrelations between the Variables Included in the Correlational Analysis for the Total Sample of Individuals* (Decimals Omitted)

	1	2	3	4	7	9	10	11	12	13	14	15	16	17	18	19	20	22	36	37	38	39	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
1																																							
2	-28																																						
3	70	-31																																					
4	-13	02	-15																																				
7	-08	-03	-02	04																																			
9	-16	06	03	-03	53																																		
10	-02	-05	00	-16	-04	01																																	
11	13	-10	11	-13	03	-04	51																																
12	-11	02	-08	-09	20	12	69	-19																															
13	14	-10	13	-02	12	02	-10	-04	-02																														
14	09	-06	15	-00	-13	-11	-04	09	-13	50																													
15	05	-06	01	-03	30	12	-07	-10	10	74	-17																												
16	09	-11	10	-13	06	12	67	35	50	67	34	50																											
17	23	-15	05	03	-10	-12	07	13	-03	18	08	10	20																										
18	09	-16	-09	-01	06	-11	13	17	04	12	02	13	19	29																									
19	18	-06	05	-03	05	-01	-01	-02	01	11	04	06	07	54	05																								
20	04	03	-10	-07	-15	-10	-01	-12	02	-07	-08	-01	-06	-01	37	34																							
22	-12	-02	-17	15	36	-18	01	-01	-00	-00	-12	09	00	-01	09	13	10																						
36	09	-37	16	-07	09	-06	00	-01	06	00	09	-03	00	06	21	-06	-00	-03																					
37	12	01	16	03	06	-06	01	11	-07	-10	-06	-06	-06	-05	-08	09	-01	13	03																				
38	03	23	-03	-05	-07	-18	05	03	01	-04	-12	04	01	-14	-14	09	08	11	-15	30																			
39	03	17	-06	01	-14	-23	04	01	-03	-01	-08	03	02	-10	-11	07	13	17	-11	24	74																		
41	-00	-00	03	-02	01	04	04	18	-08	-03	10	-11	01	-02	-06	06	-01	-06	-10	-10	05	02																	
42	-02	09	01	-07	03	05	-01	11	-09	-04	02	-06	-04	-08	-09	03	03	-03	-12	-03	19	13	84																
43	-05	06	-06	06	-11	-06	03	-01	00	-10	-05	-07	-05	04	04	-01	-02	-04	04	-00	-08	-03	-23	-32															
44	-06	13	-03	-02	-05	00	01	10	-09	-11	-01	-11	-08	-04	-05	03	02	-05	-08	-03	12	10	63	71	44														
45	-01	-12	06	-13	-01	05	-07	10	-18	14	11	08	05	07	05	11	01	-06	-04	-05	04	05	28	25	-11	16													
46	01	03	04	-08	08	07	-03	08	-07	02	04	-00	-00	-08	-08	03	03	01	-10	-02	17	10	70	86	-76	25	23												
47	01	13	01	-02	-07	-03	-01	05	-07	-09	00	-13	-08	04	01	07	04	-06	-05	-02	10	12	47	54	50	88	14	10											
48	-06	11	-04	-02	-04	02	01	11	-10	-09	-02	-08	-06	-05	-06	05	04	-03	-11	-03	13	09	67	77	32	98	17	36	81										
49	-17	-01	-18	-02	-10	06	-03	-13	03	12	07	08	06	05	-00	-05	-02	-11	-01	-74	-21	-15	10	01	06	06	03	-03	03	05									
50	-04	07	-05	09	07	-02	-06	-05	-00	-04	-02	-01	-07	01	03	06	05	-06	00	25	08	04	16	14	04	16	02	08	15	14	-06								
51	-09	-05	-17	-07	-04	02	00	-06	04	09	10	04	07	06	06	01	03	-07	05	-30	-14	-11	-08	-14	06	-09	-08	-13	-06	-11	46	-14							
52	11	20	05	-07	-02	-12	03	-02	05	-06	-11	-01	-03	-12	-08	01	06	07	-05	39	40	39	-33	-15	-09	-21	-11	-05	-18	-20	-44	-04	-14						
53	-05	10	-03	15	09	-02	-05	00	-03	-02	00	-00	-05	-01	-01	04	01	02	-04	36	07	05	08	07	03	09	00	03	07	08	-22	81	-29	-02					
54	-19	-02	-19	02	-08	09	-05	-13	02	07	03	05	02	06	-01	-05	-04	-10	01	-67	-23	-18	06	-04	06	01	-02	-06	-02	-00	93	-07	43	-46	-20				
55	08	12	02	00	16	02	-09	02	-05	00	-00	03	-06	14	06	11	02	01	-02	03	06	03	-08	01	-00	01	-07	01	02	01	-04	00	-12	13	06	-05			
56	-02	16	-05	-17	-07	-00	-13	-05	-11	-03	-10	03	-12	-13	-09	02	04	-05	-08	-03	18	16	-02	05	00	05	-02	03	05	03	02	-00	08	07	01	06	-12		
57	02	-04	06	-07	-03	03	01	12	-09	01	03	-01	01	-05	-19	-01	-08	-06	-07	08	25	20	36	35	-23	16	23	36	03	19	-04	11	-12	-13	11	01	01	01	
	1	2	3	4	7	9	10	11	12	13	14	15	16	17	18	19	20	22	36	37	38	39	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57

*Correlations above .12 are significant at the .05 level, and correlations above .16 are significant at the .01 level.

Note: Total sample contains correlations between 39 of the 57 variables.

the group is affected by the particular selection of individuals to form the truncated sample. If the group is more homogeneous as a result of the selection, then correlations will be lowered. Gulliksen (1950) has distinguished two types of selection that may be operating. Explicit selection occurs when there is a direct selection of cases on the basis of a particular variable. Incidental selection describes the situation that occurs when selection on one or more variables is brought about by direct selection on one or more correlated variables. In the present case, subjects for the truncated sample were included primarily because they had taken the Kuder Preference Record and the SCAT at the University of Illinois. Those individuals that were excluded did not have SCAT or Kuder scores available at the University Testing Bureau. The major reasons that their scores were not available were as follows: they were transfer students and took the tests at another university; they failed to take them at the University of Illinois; or their test results were not able to be located. In any case it is possible that either or both types of selection could have occurred, but it is improbable. The large majority of the excluded subjects were transfer students. And it is unlikely that transfer students differ systematically on any of the variables included in the present experiment.

There are two empirical tests which may reveal selection effects. These tests relate to the effects of selection. The first involves a comparison of the correlation coefficients that were found on the variables that overlapped the total and truncated correlational analysis. A thorough comparison of the size of corresponding correlation coefficients in Table 24 and in Table 25 indicates very small discrepancies. The second test

concerns the possible reduction in homogeneity or standard deviation resulting from selection. Evidence on this point is presented in Table 26. A careful inspection of corresponding standard deviations for those variables that were included in both the total and truncated analyses reveals very small differences, some being positive and some negative. Also the differences between the means of the corresponding variables in the two samples were found to be very small as shown in Table 27. The conclusion to be drawn from these inspections is that no systematic selection effect was operating for the variables included in the study and that the results from the analysis of the truncated samples are representative of the total sample.

For this reason, and because the largest correlations involve the SCAT and the Kuder Preference Record, which were contained in the truncated analysis only, the correlations obtained in the truncated analysis will be reported in all instances. The variables corresponding to the variable number in Tables 24 (p. 131) and 25 (p. 132) are given in Tables 9 (pp. 88-90) and 10 (pp. 90-91). Only a few of the outside variables are correlated to a significant extent with the individual coefficients on the three points of view, and still fewer are large enough to be of much assistance in defining the nature of a particular point of view.

Interestingly, none of the variables included in the study correlated to a significant extent with the first point of view (55). And no appreciably large correlations were found with the second point of view (56). Sex (2), Linguistic Score on the SCAT (33), evaluative rating of "The Average Person" (38), and evaluative rating of "People as a Whole" (39) have small positive correlations with the second point of view which

Table 26

Standard Deviations by Variable Number for the Variables Included in the Total and in the Truncated Samples

Variable Number	Standard Deviations Total	Truncated	Variable Number	Standard Deviations Total	Truncated
1	1.76	1.17	31		3.02
2	.50	.50	32		2.81
3	.99	.87	33		9.65
4	1.63	1.62	34		8.76
5		5.67	35		15.62
6		1.29	36	17.60	16.99
7			37	5.11	4.86
8		5.33	38	17.62	17.09
9			39	19.21	18.91
10	.88	.86	40		1.25
11	.62	.59	41	18.38	17.70
12	.78	.75	42	2.66	2.62
13	.88	.89	43	2.09	2.15
14	.58	.60	44	2.80	2.75
15	.78	.78	45	8.51	8.13
16	1.18	1.18	46	.24	.25
17	1.25	.95	47	.28	.26
18	.94	.81	48	.16	.15
19	1.04	.89	49	8.58	8.29
20	.89	.81	50	9.81	10.01
21		3.50	51	6.92	6.66
22			52	16.66	16.25
23		2.81	53	6.90	6.90
24		2.74	54	9.40	9.09
25		2.76	55	.18	.18
26		2.75	56	.20	.20
27		2.93	57	.17	.17
28		2.79			
29		2.95			
30		2.95			

Table 27

Means by Variable Number for the Variables Included in the Total and in the Truncated Sample

Variable Number	Means		Variable Number	Means	
	Total	Truncated		Total	Truncated
1	19.20	18.83	31		4.80
2	1.51	1.55	32		4.34
3	1.98	1.83	33		39.49
4	4.23	4.19	34		37.06
5		49.28	35		76.52
6		2.53	36	63.44	63.49
7			37	31.42	31.27
8		46.19	38	138.91	138.96
9			39	134.14	133.91
10	.92	.91	40		2.62
11	.33	.29	41	- 12.85	- 13.28
12	.59	.61	42	6.98	6.96
13	.81	.81	43	10.86	10.83
14	.28	.29	44	1.85	1.79
15	.51	.51	45	- 14.21	- 14.02
16	1.72	1.72	46	- .24	- .24
17	2.10	1.93	47	.16	.16
18	1.65	1.61	48	.10	.10
19	3.21	3.06	49	18.55	18.83
20	2.89	2.88	50	29.29	29.66
21		3.01	51	25.95	26.04
22			52	63.61	63.09
23		5.05	53	22.93	23.19
24		4.43	54	19.96	20.34
25		5.19	55	.11	.11
26		5.66	56	.63	.63
27		4.59	57	.06	- .06
28		5.59			
29		5.14			
30		4.29			

are just barely significant. Size of Home Community (4), Warm-Cold Rating of Father (17), and Warm-Cold Rating of Mother (18) all have very small but significant negative correlations with the second point of view. Thus there is some slight evidence that females, people with high linguistic ability, people who rate other people as "good," individuals who come from smaller communities, and persons who rate their parents as "warm" have relatively higher coefficients on the second point of view. The indication is that people who tend to be more positively evaluative of others tend to utilize the second point of view to a slightly greater extent. However, the obtained correlations are not large enough to permit the interpretation that the second point of view represents the structure of perceived personality for the person who is highly evaluative of others.

Three correlations with the third point of view (57) are quite sizeable and are of considerable assistance in defining it. The linguistic score on the SCAT (33) correlated -.57, authoritarianism as measured by the California F scale (41) correlated .39, and scientific interest (26) measured by the Kuder Preference Record correlated -.24 as obtained on the truncated sample. The person who received a large coefficient on the third point of view is the relatively less verbally intelligent authoritarian. And there is some evidence that he is low in the area of scientific interest. The inverse relationship between intelligence and authoritarianism is consistent with general findings that exist concerning the authoritarian personality. (Messick & Fredericksen, 1958; Triandis, Mikesell & Ewen, 1962a.) The third point of view then may be regarded as closely aligned to that of the authoritarian person. This will be of considerable assistance in the interpretation of shifts in perceived

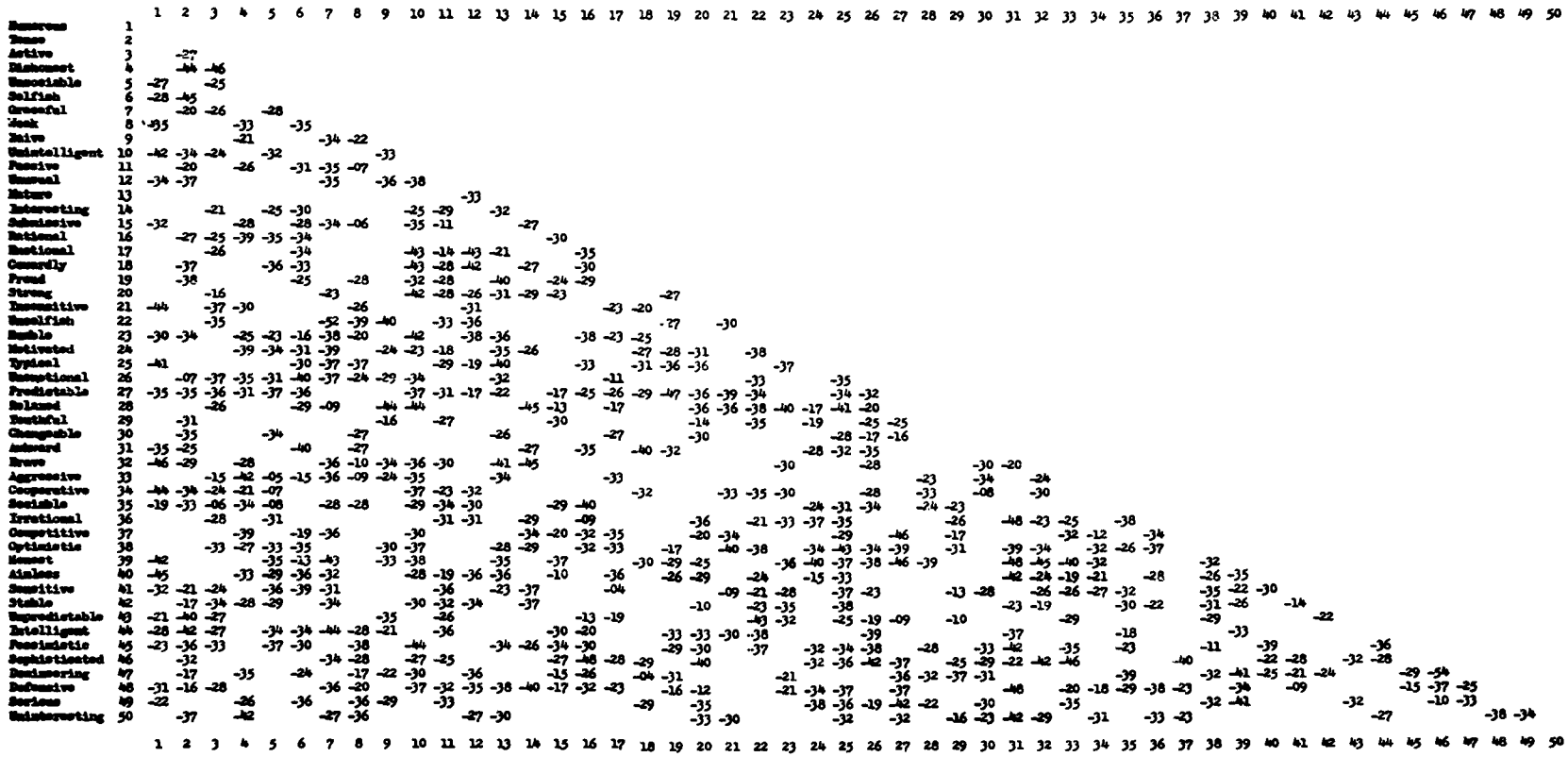
personality trait similarity described by the third point of view.

Outside of the three large correlations, there were some smaller correlations involving the third point of view that are of interest. There is some tendency indicated by these smaller correlations for the person who shifts from the second point of view as defined by the third point of view to have more older brothers (11), to rate his mother as being warmer (18), to obtain high evaluative scores on the Interpersonal Rating Scale (38,39), to acquiesce as measured by the California F scale (44, 47, 48), to have an intolerance for ambiguity (45), and to be more cooperative (52). There does not seem to be a distinction between the second point of view and the third point of view as to evaluation, since evaluation variables correlate with both.

The structure of item relationships for the composite dimensions. To better understand the nature of the idealized individual represented by dimension two and of the alteration points of view it is necessary to investigate the structure of item relations given by the matrices of item coefficients. It has been suggested that the 300 item coefficients for each dimension obtained from the TSRS-A can be combined with the 300 item coefficients for the corresponding dimension obtained from the TSRS-B to form a single matrix $\hat{Z}_c$. Thus for each of the three dimensions there are item coefficients for 600 of the total possible 1,225 items (resulting from complete pairings of fifty trait-names). These coefficients can be arranged in three lower triangular matrices, one for each dimension, where each element represents the item coefficient for the intersecting trait-names. These matrices are given in Tables 28, 29 and 30. These matrices are similar to correlation matrices except that the elements range from

Table 28

Matrix containing the 600 item coefficients on rotated composite factor one*



*The decimals have been omitted to conserve space. All entries are to one decimal place (eg. 24 would read 2.4).

Table 29

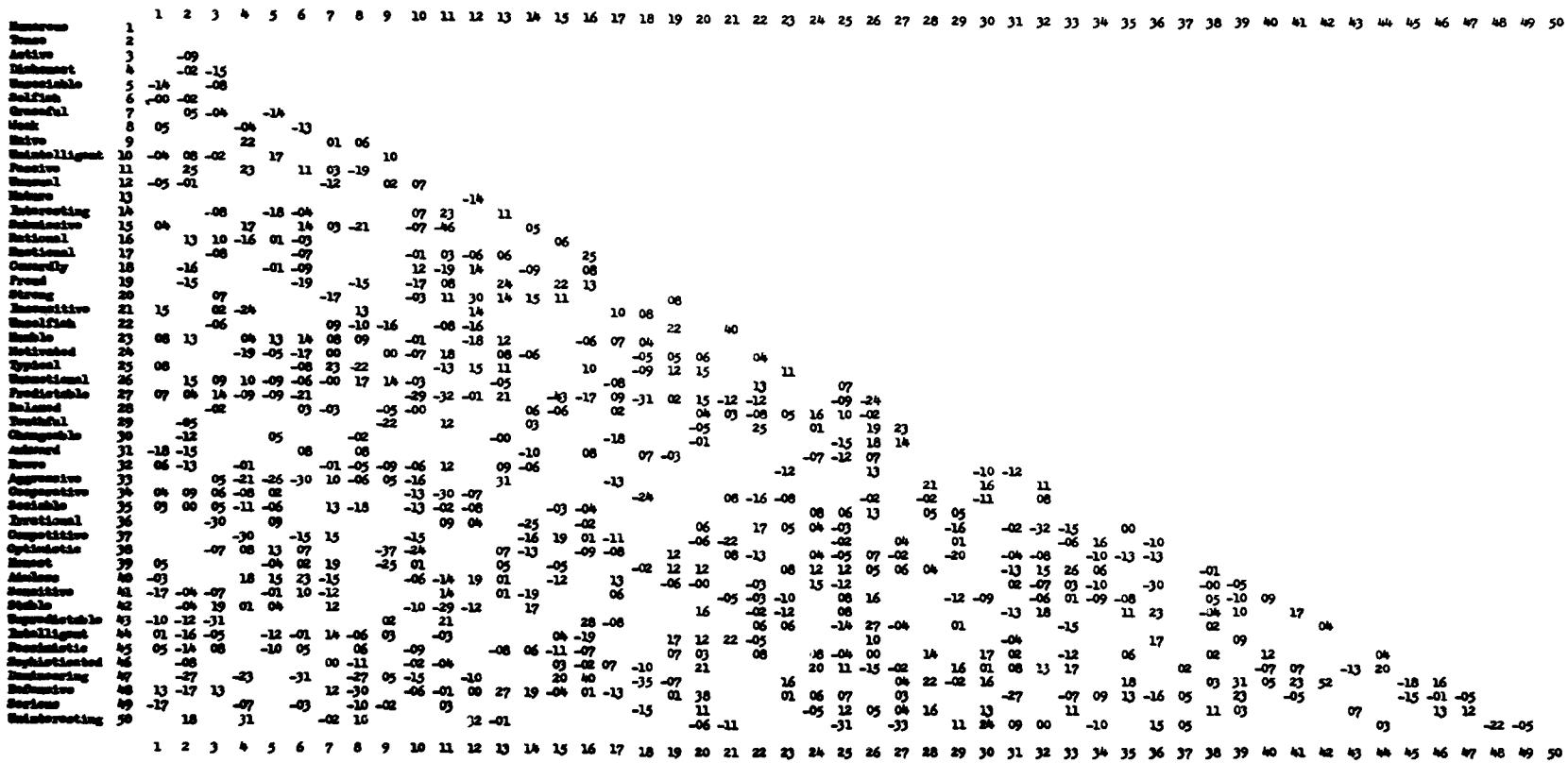
Matrix containing the 600 item coefficients on rotated composite factor two*

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Humorous	1																																																	
Tense	2																																																		
Active	3		06																																															
Dishonest	4		13	-01																																														
Unsociable	5	-21		-25																																													
Selfish	6	-15	15																																														
Grateful	7		-27	20		-18																																											
Weak	8	-09			13		10																																										
Naive	9				-19			-05	09																																								
Unintelligent	10	-11	-04	-15		04				15																																							
Passive	11		-19		-13		-09	00	22																																								
Unusual	12	18	-02					-01		-00	-08																																						
Mature	13												-08																																				
Interesting	14			29		-17	-13				-21	-16		24																																			
Submissive	15	-09			-09		-18	-05	34		08	29			-17																																	
Rational	16		-07	03	-07	-10	-08									-12																																
Emotional	17			15			08				00	-21	05	-05			-12																														
Cowardly	18		21			10	13				04	14	-05		-18		-15																													
Proud	19		02				11		-19		-10	-13		19		-25	14																													
Strong	20			30				09			-07	-16	-07	22	20	-30				29																									
Insensitive	21	-05		-04	14				-05				-01					-30	-10																											
Unselfish	22			19				10	-06	08		07	02							10		-12																							
Humble	23	-04	-10		-21	-09	-27	07	07		-18		02	10			10	-02	-03																										
Motivated	24				-08	-12	07	16		-12	-17	-31		25	30				19	24	28		08																						
Typical	25	05					-07	05	-03			-00	-38	01			07		-11	07	05			-03																				
Unemotional	26		-27	-05	05	06	03	-04	-06	-07	-17			09				-44					-03			-07																	
Predictable	27	-03	-03	12	-10	-05	03				-01	08	-24	15		14	25	-15	06	10	14	02	-01			25	12																
Relaxed	28			-10	*		-15	33		08	-06				19	10		-29			15	10	15	13	20	08	23																
Youthful	29		-07						25			-15			23						27		-04		22		-22	-13														
Changeable	30		10			-02				22				01				31			-07					-01	-20	-26														
Awkward	31	00	21				-02			16					-12		-13		07	-16					-14	-11	-10															
Brave	32	05	03		-18			14	-38	-08	-10	-17		24	21									08			05					-02	-17									
Aggressive	33			35	09	-16	19	-04	-37	-22	-06			06				17										-19			05		25									
Cooperative	34	12	-14	23	-20	-30					01	09	-01						-02			04	27	16			-03		24		10		17								
Sociable	35	27	-11	28	-13	-46		27	-10		-08	-05	-05				-06	14							19	14	-03		25	25												
Irrational	36			07		07						-06	06		-02			-47				-08		-14	-13	-10	-09			16		08	-04	05		-08						
Competitive	37				10		15	04			-15			22	-30	12	15				31	03				-02		07		26				36	-03		01					
Optimistic	38			21	-13	-14	-10			15	-02			17	20		10	06		18		-04	14		18	08	-02	10		34		-10	19		21	21	00				
Honest	39	14				-14	24	09		15	-09			24		-02			-14	26	24			20	23	-09	-02	19	18			-02	23	03	23			15				
Aimless	40	-00			02	05	-06	-14			12	21	-03	-24		15		-00		-19	-18		-08		-36	-07						14	-20	-24	-16		18		-13	-11			
Sensitive	41	06	28	06		05	00	11			-05		09	13				34				-46	07	20		05	-30			15	15		07	-09	11	08		06	20	-11			
Stable	42		-24	13	-20	-15		16			-19	07	-08		18						32		22	12		12										20	-29		16	26		02			
Unpredictable	43	17	14	15						02		-13					-23	22					-05	-13		-13	-11	-46		27			13					-02		-28			
Intelligent	44	22	05	29		-06	-11	13	-18	-19		-08				-13	30			23	22	-15	16			03					-12				-23					26				
Pessimistic	45	-18	15	-10		14	10		10		03			-05	-08	05	-03			-12	10		-13		-07	-05	-00		-13		-02	02		-07		-17		-43		06		-07			
Sophisticated	46		-03				26	-16			-18	02				-12	18	-09	-15		16				12	-01	08	15		-11	-03	-27	08	10			13		-17	06		-05	19				
Domineering	47		11		03		24		-30	-22	-07		-02			-39	00		-28	26				-33				12	-14	08	-11				04			09	-01	-21	-10	03		-02	10			
Defensive	48	-08	25	06			-10	-01		-05	-10	-05	-05	-07	-16	03	21			17	07			-10	04	01		00				08		-05	-17	-10	07	13		-05		23			13	-01	04			
Serious	49	-26			-21		-04		-14	-11		07							-09		20				28	03	04	18	-04		-07			11				06	25			-11			14	14			
Uninteresting	50		06		-02			-19	12				-20	-15							-13	09				04		07		-25	-19	13	-17		-06		-04	-18				-21				-03	-04		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50

*The decimals have been omitted to conserve space. All entries are to one decimal place (eg., 24 would read 2.4).

Table 30

Matrix containing the 600 item coefficients on rotated composite factor three*



*The decimals have been omitted to conserve space. All entries are to one decimal place (eg., 24 would read 2.4).

approximately -4.5 to +4.5 instead of -1.0 to +1.0. And as the correlation coefficient can be interpreted as a cosine, the item coefficient can be interpreted as proportional to a cosine. In fact, if there had not been incomplete data the structures of the item coefficient matrices could have been determined through the utilisation of conventional factor analytic procedures just as the structures of correlation matrices are determined. At present convenient quantitative methods of factoring do not exist for matrices with missing off-diagonal cells. This problem is related to the estimation of communalities problem.

There are factors which account for the relations between items that exist for the second dimension. This factor space will be referred to as a "perceptual space."

A factor matrix for the second dimension was obtained in the absence of quantitative methods through the kind of "subjective factor analysis" described in the previous chapter. The matrix is given in Table 31. An inspection of the matrix indicates that the trait-names defining the factors go together in a rather conventional fashion. This is what would be expected since the estimated trait ratings for most individuals represent a large amount of this dimension plus or minus smaller amounts of the other two dimensions. That is, the other two dimensions represent departures or shifts away from a rather standard or conventional way of perceiving trait relationships.

An inspection of the factor loadings on the first two factors indicates that they are oblique. Many of the trait-names load on both factors. The first two factors are also the most important judging from the number and size of their loadings. Considered together they seem to

Table 31

Subjective Factor Matrix Showing the Structure of Relations Between Trait-Names for Idealized Individual Number Two

Trait No.	Trait-Name	Factor I	II	III	IV	V	VI	VII
1.	Humorous	+	++			++		
2.	Tense			++				+
3.	Active	+++				++		
4.	Dishonest				--	--		+
5.	Unsociable	--	--			---	-	
6.	Selfish							+++
7.	Graceful		++			++	+++	
8.	Weak	----	--			-	-	
9.	Naive						--	-
10.	Unintelligent	--	---			-	--	
11.	Passive	--		--				-
12.	Unusual				---			
13.	Mature	++	++			+		
14.	Interesting	++	++		++			
15.	Submissive	----	--				-	-
16.	Rational	++	+++		++	+	++	
17.	Emotional			+++	--			+
18.	Cowardly	--	-			--	-	
19.	Proud	++	++			+	+	
20.	Strong	+++	+		+	+		
21.	Insensitive			---				
22.	Unselfish		++			++		--
23.	Humble							---
24.	Motivated	++	++		+	+	+	
25.	Typical				+++	+	+	
26.	Unemotional			---				
27.	Predictable			--	+++			
28.	Relaxed			--	++	++		
29.	Youthful	++		+			--	
30.	Changeable			++	--			
31.	Awkward	-	--		-	--	--	
32.	Brave	++	++		+	++	+	
33.	Aggressive	+++						++
34.	Cooperative		+			+++		-
35.	Sociable	++	++		++	+++	+	
36.	Irrational		---		-		--	+
37.	Competitive	+++						+
38.	Optimistic	++	+			++		
39.	Honest	++	++			++		
40.	Aimless	--	--			-	-	
41.	Sensitive			+++				
42.	Stable		++		++	++	+	-

Table 31
(Continued)

Trait No.	Trait-Name	Factor I	II	III	IV	V	VI	VII
43.	Unpredictable			++	---			
44.	Intelligent	++	+++		+	+	++	
45.	Pessimistic	-	-			--	-	
46.	Sophisticated		++			+	+++	
47.	Domineering	+++					+	++
48.	Defensive			++				
49.	Serious				+		+	
50.	Uninteresting	-						

represent "evaluative" dimensions. The first looks like the cultural ideal for "male." It is a sort of "social desirability" factor in that the traits that are considered important in males by the culture load highly on it. That is, it is important to be first ACTIVE (3), STRONG (20), AGGRESSIVE (33), COMPETITIVE (37), and DOMINEERING (47), and then, almost incidentally, INTELLIGENT (44), RATIONAL (16), MATURE (13), etc. Trait-names falling on the other end of the factor are WEAK (8), and SUBMISSIVE (15). Traits identifying the second factor are RATIONAL (16) and INTELLIGENT (44), vs. IRRATIONAL (36) and UNINTELLIGENT (10). These and the other traits that load on the second factor suggest that they are related according to a perceived "mental potency." The third factor involves relation as a result of "emotionality." High loading trait-names on the third factor are EMOTIONAL (17) and SENSITIVE (41) vs. UNEMOTIONAL (26) and INSENSITIVE (21). The fourth factor suggests relation due to "stability." The identifying trait-names for this factor are PREDICTABLE (27) and TYPICAL (25), vs. UNPREDICTABLE (43) and UNUSUAL (12). Trait-names on the fifth factor relate to "sociability." Trait-names with large

loadings are SOCIABLE (35) and COOPERATIVE (34) vs. UNSOCIABLE (5). Glaringly absent is COMPETITIVE (37). The evidence is that it is not in this case the opposite to cooperative. Factor six has very few moderately large and very large loadings, but SOPHISTICATED (46) and GRACEFUL (7) vs. AWKWARD (31) suggest that this factor relates to "sophistication." And the last factor, seven, is identified by SELFISH (6) vs. HUMBLE (23). These traits and the others with smaller loadings suggest a kind of "greediness" factor. Thus, seven factors seem to account for the item coefficients for the second idealized individual. The reader can and should gain more definite clarification of the factors by thoroughly examining the reported factor matrix and noting the trait-names that are highly interrelated on each factor. Although fairly subjective procedures were used to obtain the factor matrix, it is believed that through painstaking effort a rather accurate representation of the data has been obtained. A certain indefiniteness of results was necessitated because of the missing information. And possibly slightly different results would have been obtained had different trait-names been used at various points to begin forming clusters of relationship. At any rate, the obtained structure quite sensibly orders the structure of trait relations for the "conventional" point of view.

The item coefficients on the first point of view in relation to the second point of view indicate that the first point of view represents a correction for a response set or for a misuse of the rating scale of the TSRS. <u>All</u> item coefficients for this point of view are <u>negative</u>. So the individuals who had high individual coefficients on this point of view are individuals whose original trait ratings are altered from the conventional

or standard view of the second idealized individual by a shift toward the negative end of the rating scale. Ratings of two trait-names that are extremely similar or extremely dissimilar (as reflected by item coefficients on the second point of view) shifted only to a slight extent. The explanation for this is that in the former case the trait-names are so highly similar that the usage of the extreme positive end of the rating scale is obvious and inalterable, and in the latter case when the extreme negative end of the scale is indicated, a more negative rating is impossible. There were, as a result of the trait-names included in the rating scale, more instances of extremely dissimilar than extremely similar trait-names. If an individual had a response set to respond toward the negative or low end of the rating scale his ratings would be shifted negatively from the standard or conventional ratings. Or in the case of the present rating scale, if individuals misinterpreted the -4 or extremely dissimilar end of the rating scale as extremely unrelated (i.e., if they equated in their minds dissimilarity and unrelatedness), they would have tended to mark a preponderance of negative ratings. It is difficult to make a choice between these two interpretations in terms of the evidence at hand. It is probable that both elements were in operation both between and among individual raters. The fact that the shifts to the left seem to apply equally as much to positive as to negative ratings lends some favor to the negative rating set interpretation. This is a topic that may warrant further investigation.

The item coefficients for the third point of view were even less clearly interpretable. In general, the item coefficients or coefficients of shift were relatively low. In fact only 76 of the 600 coefficients

were 2.0 or larger. A coefficient of size 2.0 or larger was arbitrarily determined to be indicative of a meaningful shift in item similarity. Coefficients whose magnitudes were less than 2.0 represent little actual shift in the perceptual space of the second idealized individual since the size of the individual coefficients on the third point of view, b_{3i}, were relatively small as compared to the size of the individual coefficients on the second point of view, b_{2i}, as mentioned earlier. The coefficient of shift on the third point of view must be fairly large to be efficacious in making a shift. The resultant perceived similarity between two trait-names can be understood only through an examination of the item coefficients on the second point of view as well as those on the third point of view. The item coefficients on the first point of view can be more or less ignored in this respect since what they subtract out is rather general and does not appreciably affect the interpretations made without them.

As a first step in the understanding of the coefficients of shift, a frequency distribution was made indicating the number of times each trait-name was involved as one of a pair of trait-names whose coefficient of shift was as large or larger than 2.0.[21] The 152 occurrences as they are distributed over the fifty trait-names are given in Table 32. An examination of frequency of involvement in a shift of 2.0 or larger and an inspection of the matrix of coefficients of shift led to the selection of the trait-names that are preceeded by two asterisks in Table 32, as those that are principally involved in shift in point of view. The twelve trait-names that were selected are involved in sixty of the seventy-six shifts of 2.0 or larger. The four that are preceeded by one asterisk are secon-

[21]It may be well to reiterate that a shift of 2.0 indicates that the item coefficient for the idealized individual number two is altered plus or minus some proportion of 2.0. The shift may nullify, extend, or reverse the initial item coefficient.

Table 32

Frequency Distribution of the Number of Times Each Trait-Name is Involved in a Shift in Item Coefficient 2.0 or Larger from the Second to the Third Point of View

Trait Number	Trait Name	Frequency	Trait Number	Trait Name	Frequency
1	Humorous	0	26	Unemotional	2
2	Tense	2	**27	Predictable	9
3	Active	2	28	Relaxed	2
** 4	Dishonest	7	29	Youthful	4
5	Unsociable	1	30	Changeable	1
6	Selfish	4	31	Awkward	1
7	Graceful	1	32	Brave	1
** 8	Weak	4	**33	Aggressive	6
* 9	Naive	4	34	Cooperative	2
10	Unintelligent	2	35	Sociable	0
**11	Passive	8	**36	Irrational	5
12	Unusual	2	37	Competitive	2
13	Mature	4	*38	Optimistic	3
14	Interesting	2	39	Honest	4
**15	Submissive	5	40	Aimless	2
**16	Rational	3	41	Sensitive	1
17	Emotional	1	42	Stable	3
18	Cowardly	3	**43	Unpredictable	4
19	Proud	3	44	Intelligent	2
20	Strong	3	45	Pessimistic	0
21	Insensitive	4	*46	Sophisticated	3
*22	Unselfish	3	**47	Domineering	11
23	Humble	0	**48	Defensive	6
24	Motivated	1	49	Serious	0
25	Typical	3	**50	Uninteresting	6

**Trait-names which seem to be principally responsible for the shift in point of view.

*Trait-names which seem to be secondarily responsible for the shift in point of view.

darily responsible for the shift and are involved in eleven of the remaining sixteen "meaningful" shifts. Thus, those individuals that possess large positive coefficients on the third point of view shift from the second point of view primarily with respect to how they see the following trait-names as relating to other trait-names: DISHONEST (4), WEAK (8), PASSIVE (11), SUBMISSIVE (15), RATIONAL (16), PREDICTABLE (27), AGGRESSIVE (33), IRRATIONAL (36), UNPREDICTABLE (43), DOMINEERING (47), DEFENSIVE (48), and UNINTERESTING (50). The nature of these shifts in relations will be explored quite extensively. The interest is in the change of relationship between trait-names from the second to the third point of view. Therefore, the coefficients of shift of size 2.0 or larger on the trait-names of interest must be compared to the corresponding item coefficients on the second point of view.

A large number of the shifts are related to "domineering" and its perceived relation to other traits. An examination of the item coefficient matrices for the second and third points of view indicates that the person with a large positive score on the third point of view (i.e., the authoritarian individual) perceives domineering as more similar to honest, stable, and rational. However, it is more unrelated to tense, selfish, relaxed, and sensitive. It is more dissimilar to weak and cowardly, but it is a little less dissimilar to submissive. The shift seems to be away from the picture of the domineering person as tense, selfish, and insensitive to his being more honest, stable, and rational.

The "rational" person tends to be perceived as less similar to predictable; more similar to domineering, active, interesting, and brave; emotional rather than unemotional; and unrelated to motivated, stable, and intelligent.

"Dishonest" bears greater similarity to aimless, and uninteresting but less to motivated and competitive. Little relation is seen between dishonest and sophisticated, active, and insensitive, whereas, they were similar in the second point of view.

"Predictable" and "Unpredictable" are two other trait-names whose similarity to other trait-names shifts quite markedly. For example, whereas they were unrelated in the second point of view, selfish, unintelligent, passive, cowardly, and uninteresting all become dissimilar to predictable. The predictable person is also less rational. A shift that is particularly interesting is the shift from predictable as similar to submissive to being highly dissimilar. Also youthful-mature has virtually no relation to predictable after the shift. The "unpredictable" person is seen as passive rather than active and as unemotional rather than emotional. Unpredictable is also perceived as unrelated to rational. Thus, the predictable person is perceived as being quite active, emotional, unselfish, intelligent, not submissive, less rational, brave and interesting. This is quite a dramatic shift away from the view of the predictable person as passive, unemotional, submissive, rational, and mature.

The supposedly opposite trait-names "aggressive" and "defensive" were not perceived as being opposite by individuals who were high on either the second or the third point of view. Rather they were seen as quite unrelated. The "aggressive" person was seen after the shift as being unselfish, honest, mature, and more sociable. Before the shift aggressive was similar to selfish, tense, and less sociable. "Defensive" was related to a number of trait-names after the shift that it was not related to before the shift. The defensive person after the shift was

perceived as being strong, mature, interesting, honest, and graceful.

"Passive" and "submissive" were considered to be quite similar before the shift, but were unrelated after the shift. Passive was seen as dissimilar to tense, unpredictable, dishonest, and interesting before the shift but as unrelated to those trait-names after the shift. On the other hand, whereas passive was unrelated to predictable, cooperative, and stable before the shift, they were seen as definitely dissimilar after the shift.

Submissive was strongly similar to weak and passive and somewhat similar to predictable on the second dimension, and it was dissimilar to proud, competitive, and domineering. The shift was toward perceiving the submissive person as not quite as weak, and no so opposite to proud, competitive, and domineering. Also, there was a complete shift to seeing the submissive person as dissimilar to predictable rather than similar to predictable. A dissimilarity with predictable is perceived for both "passive" and "submissive" after the shift.

There was some shift in "weak" on the third point of view, but it was relatively consistent in direction. After the shift the weak person was perceived as being not quite as submissive and a little more domineering. Whereas weak was not related to typical or defensive before the shift, it was seen as relatively dissimilar to them after the shift.

Quite a change was effected in some of the traits that were related to "uninteresting" by the authoritarian person. Traits that became related to uninteresting that were not related on the second point of view were dishonest, typical, predictable, and defensive. The uninteresting person was seen as one who is dishonest, not typical, not predictable, and not defensive. Of particular interest is the relation of unusual

to uninteresting. On the second point of view they were perceived as slightly dissimilar and after the shift they were perceived as slightly similar.

Taking an overview of these shifts, it appears that domineering sheds devaluative connotations and picks up more of a positively evaluative meaning. Rational tends to lose its intellectual meaning and tends to acquire positively evaluative meaning that is somewhat unrelated to intellectual functions. Predictable becomes dissociated with negatively evaluative traits. But it is definitely going off in a separate direction from rational because the predictable person is perceived as being less rational, and it is also seen as dissimilar to submissive. Much the same shift in meaning occurred for aggressive as for domineering. A particularly interesting change in meaning occurred for defensive. It acquired a relationship to a number of traits somewhat suggestive of those related to domineering. This is interesting since the perceived relationship between domineering and defensive is one of dissimilarity albeit less dissimilarity. Apparently, the high scoring individual on the third point of view has a view of trait relationship that includes a number of logically tight compartments. This is suggestive of the willingness to entertain contradictions on the part of individuals with a "closed mind" as discussed by Rokeach (1956). Passive loses some of its positively evaluative meaning and becomes more dissimilar to predictable, cooperative, and stable (i.e., becomes more negatively evaluative). The submissive person rather than being not predictable becomes predictable. The trend of the change in this trait with other traits is characterized by a tendency to shift a little away from weak toward domineering, although it is still

more closely related to weak. Weak also shifted a little in the domineering direction and was perceived to be not typical and not defensive. Finally, the uninteresting person was perceived as the dishonest, not typical, not predictable, and not defensive person.

The implications of these results are of considerable importance. Unfortunately, experimental contingencies resulted in partial data so that a precise structuring of the perceptual space for the idealised individual (i.e., the second point of view) and the nature of shift in trait relations by the person high on the third point of view was not possible. But the results obtained from the less rigorous procedures utilized (although they may be somewhat less complete and less precise) are sufficiently clear that some important conclusions may be drawn.

In the first place, there seems to be ample evidence that one of the principal ways in which individuals differ in their perceptions of the relationships between traits, and hence of other people, is a dimension that is closely related to what has been called the authoritarianism of the individual. The authoritarian personality syndrome appears to be basic in the determination of how a person perceives other persons. In the case of authoritarian subjects traits are defined differently and are perceived in different relationships to each other. Furthermore, these differences are restricted to a number of traits that are of importance to the authoritarian and to which he is sensitised. Other traits in the reporatory of traits constituting his "implicit personality theory" are perceived in relationships that are much the same as those of the non-authoritarian. Stating it another way, the perceived trait relationships of the authoritarian are similar to those of the non-authoritarian except for a nucleus

of traits which have special meaning for him that can be conceived as a shift away from a more conventional view. In the model employed in the present research the shift is additive. A modified version of the formula for approximating the trait similarity ratings helps to clarify this point. Since the first point of view affects things in a general way, the individual coefficient for that point of view will be set equal to zero so that the first term drops out. And since the interest is in the nature of the shift away from the conventional point of view, the individual coefficient for the second point of view will be assigned the value of unity. The simplified formula expressing the approximation to the similarity-dissimilarity relationships between traits for the authoritarian then becomes

$$\hat{x}_{f(jk)i} = \hat{z}_{f(jk)2} + \hat{z}_{f(jk)3}\, b_{3i}$$

It is seen that given a fixed amount of the conventional point of view the trait relationships that exist for the authoritarian are equal to item coefficients of similarity for the conventional point of view plus an amount of the item coefficients of shift. And the amount of the item coefficient of shift that is involved depends upon the individual's extent of authoritarianism.

It is of interest that these findings were obtained in the absence of any theoretical preconceptions on the part of the investigator. One of the principal strengths of the method of analysis utilized is that there is no a priori specification of dimensions on the part of the investigator. This supports the logical validity of the concept of the authoritarian personality.

An attempt has been made to specify the nature of the perceived trait similarity that exists for the traits that are critical for the

authoritarian. The nature of the data has required that these specifications be somewhat incomplete. However, the data were complete enough that the general structure of trait relations for the authoritarian is conveyed. Subsequent investigations based on these findings, and hence, of a more refined nature, should result in an even clearer description of trait relationships that exist for the authoritarian.

The structure of trait relations that was found above contributes to a more thorough understanding of the "implicit personality theories" of authoritarians. It has been reported (Frenkel-Brunswik, Levinson, & Sanford, 1958) that the authoritarian has an inability to seriously criticize anyone in his in-group, has idealization of representatives of authority, and has a submissive relation to them. At the same time he tends to exercise personal power over others who play a deferent role. Submission does have a rather unique meaning for him. The role of submission for the authoritarian personality has been extensively discussed by Fromm (1947). He has suggested that the mechanism behind authoritarianism is the desire to give up the independence of self and to identify with somebody or something outside of oneself in order to acquire strength. This may be accomplished either through domination or submission. He admires authority and tends to submit to it, but as the same time he wants to be an authority himself and have others submit to him. Fromm has stated that "power facinates him not for any values for which a specific power may stand, but just because it is power. Just as his 'love' is automatically aroused by power, so powerless people or institutions automatically arouse his contempt. The very sight of a powerless person makes him want to

attack, dominate, humilate him" (1947, p. 168). "The authoritarian character does not lack activity, courage, or belief. But these qualities for him mean something entirely different from what they mean for the person who does not long for submission" (p. 172). Activity in this sense means to act in the name of something higher than one's self. Perhaps this explains his view of submissive being unrelated to passive and not quite so similar to weak, and not so opposite to proud, competitive, and domineering. Since he submits to authority figures, submission must not be so "bad." This also is relevant to his view of domineering as more positively evaluative and shorn of its "cruel" aspects. This is reflected in the F scale item "Every person should have complete faith in some supernatural power whose decisions he obeys without question."

Also the uninteresting person is he who is dishonest, unusual, and unpredictable. This suggests that that which is ambiguous to the authoritarian is uninteresting. He tends to prefer a structured world. These findings are consistent with the suggestion by Frenkel-Brunswik (1949) that "tolerance-intolerance of ambiguity" is the unifying construct of the authoritarian personality. This is corroborated by the correlation of .29 obtained between intolerance for ambiguity and authoritarianism. The basis for this in his personality dynamics is probably his "projectivity"--disposition to imagine strange, evil, dangerous, destructive forces at work in the outer world. The basis of the projectivity is ascribed to be projections of deep-lying sexual and aggressive strivings. Hence, the more structured the world, the less able he is to perceive threats. Beacuse he is threatened he is defensive. This probably accounts for the perceived similarity of defensive to strong, mature, interesting, honest,

and graceful. The world is a hostile place and thus one must be defensive. In fact, it is good to be defensive. This attitude is expressed in one of the F scale item. "Nowadays when so many different kinds of people move around and mix together so much, a person has to protect himself especially carefully against catching an infection or disease from them."

Aggression, too, has a particular meaning for the authoritarian. Just as it is unacceptable to dominate ones in-group, it is unthinkable to display aggession against ones family. On the other hand he feels that ". . .homosexuals should be severely punished. . ." Aggression was perceived as similar to selfish, tense, and less sociable by the conventional person, but the authoritarian perceived honest, unselfish, mature and sociability to be similar to aggressive.

The less intelligent authoritarian also perceives rational in a rather different way as compared to the conventional way. Perhaps because he is less intelligent, he perceives the rational person as more similar to individuals who are domineering, active, interesting, and brave rather than to more intellectual traits.

An attempt has been made in the above discussion to relate some of the known characteristics of the authoritarian personality to the structure of trait-names relationships as they are perceived by individuals scoring high on the third point of view. These relations have been drawn in a sketchy way to show some speculated interrelations between existing knowledge about the authoritarian and his "implicit personality theory" as defined by his perceptions of trait relationships on a few critical trait-names. There is some evidence that these interrelations do go together in a meaningful way. The most important finding, however, is that

individuals who have large individual coefficients are relatively unintelligent authoritarians, that they have an "implicit personality theory" that is somewhat disparate from that of a conventional person, and that their alterations in perceived trait similarity occur in a manner that is both meaningful and predictable.

Interrelationships Between the Outside Variables

The outside variables included in the present research represent a heterogeneous sampling of personality and biographical variables. Therefore, the interrelationships between these variables are of interest.

A kind of study within a study evolved when it was decided to include a measure of acquiescence response set from the California F scale as well as the usual authoritarianism score. Several formulas were in existence for obtaining an acquiescence response set score as well as an authoritarianism content score (Chapman & Bock, 1958; Messick, 1961; Messick & Frederiksen, 1958; Triandis & Triandis, 1962; Triandis, Mikesell, & Ewen, 1962a, 1962b). It was decided to include some of the most prominant of these so as to clarify some of their properties. The scores that were obtained have been discussed in a previous chapter.

A number of recent investigations (Bass, 1955; Chapman & Campbell, 1957; Jackson & Messick, 1957, 1958; Jackson, Messick, & Solley, 1957a; Leavitt, Hax, & Roche, 1955; Messick & Jackson, 1957, 1958; Shelly, 1956; Triandis & Triandis, 1962; Triandis, Mikesell, & Ewen, 1962a, 1962b) have demonstrated that a large part of the variance in the California F scale is attributable to acquiescence response set. Findings in the present study shed light on the relationships that exist between the various set

and content scores on the logical validity of the California F scale (i.e., to what extent it measures acquiescence versus authoritatianism). Results from the truncated correlational analysis reported in Table 24 will be discussed.

The California F scale (41) scored in the usual manner (F), has large positive correlations with the number of agreement ratings on the positive items subscale of the F scale (42) (P) (.82), with Triandis' Acquiescence Response Set Score (44) (R) (.56), with the Authoritarian Content Score (46) (C) (.70), and with the second Acquiescence Response Set Score (48) (S_2) (.61). The correlation with the first Acquiescence Response Set Score (47) (S_1) (.36) indicates that it is more independent of content that the other Acquiescence Response Set Scores. This is corroborated by a comparison of the correlation between C (46) and S_1 (47) (.00) with the correlation between C (46) and S_2 (48) (.32). Actually, the correlation between S_1 (47) and S_2 (48) (.82) indicates that they are closely related scores. Also R (44) is closely related to both scores as might be expected; the correlations are .90 and .97 respectively. The .97 correlation indicates that R is probably a more desirable score than S_2 when scores are being obtained on a large number of subjects because it is computationally easier to obtain. and R (44) is fairly independent of the content score C (46) (.20). A choice between S_1, S_2, and R cannot be made in terms of correlations along. It is true that S_1 is more independent of authoritarian content corrected for acquiescence response set than either S_2 or R, but independence is built into the formula. Additional evidence in terms of the reasonableness of scores and of the model must be considered. And, the formula as derived

permits a negative content score which is not reasonable. Altogether, the evidence indicated that there is a fallacy in the model from which S_1 is derived (cf. Messick, 1961). The choice seems to be between S_2 and R.

From a practical standpoint, it would seem to be recommended that S_2 and C be obtained when possible from the California F scale by including a scale of negative items such as that included in the present study. R and C could be obtained as an alternative without much loss. Certainly, the inclusion of C is indicated on the basis of the relative independence of C and the various acquiescence response set scores and on the basis of the large correlations that were found between the F scale and both the conetent score (C) and the various response set scores.

The finding that there is a fairly large correlation between the F scale and the content score corrected for acquiescence response set indicates that there is much valid variance accounted for by the F scale shorn of acquiescence response set. This finding coupled with the striking result of the principal part of this research that there is a basic type of person as to how personality traits are perceived as going together that can be described as an authoritarian (as measured by the California F scale) reinstates the California F scale as a valid measure of the authoritarian personality syndrome.

It has been known for some time that substantial sources of response bias exist and pervade personality measures having wide varieties of item content (Cronbach, 1946, 1950). Recent investigations have done much to clarify the role of such response biases. Jackson and Messick (1958) have distinguished between the interpretation of behavior in terms of "content" and "style" and have suggested that stylistic response determinants such

as the tendency to respond in the socially desirable direction or to acquiesce might be considered to represent important personality traits as well as systematic sources of error. Several other investigations have born out the importance of these two response styles (Edwards, 1957; Edwards, Diers, & Walker, 1962; Messick, 1960b). Edwards (1957) reports that the two are independent. This finding is corroborated by the present research. Correlations obtained between the Social Desirability Scale (37) and Acquiescence Response Set Scores (44, 47, 48) were not significantly different from zero.

Other variables included in the study, with which social desirability was correlated positively, were as follows: Evalutative Rating of "The Average Person" (38), Evaluative Rating of "People as a Whole" (39), Rhathymia (50), Cooperativeness (52), and Extroversion (53). Those variables correlating negatively with social desirability are Cycloid Disposition (49), Thinking Introversion (51), and Neuroticism (54). These correlations are in the expected direction. The person who is willing to endorse socially undesirable items that apply to himself tends to be emotionally unstable and introverted. And individuals who answer in the socially desirable direction obtain higher scores on personality measures of Rhathymia, Cooperativeness, and Extroversion and rate other people as being more highly evaluative.

The acquiescence response style (44, 47, 48) correlated positively with California F scale (41), Intolerance of Ambiguity (45), Authoritarian Content Score (46), and Rhathymia (50), and correlated negatively with Cooperativeness (52). These findings suggest that scores obtained on a number of the scales are confounded by acquiescence response style.

Of particular interest are the correlations of acquiescence with the Authoritarian Content Score. Since the content score has been developed to be statistically independent of acquiescence, the correlations indicate that acquiescence response style is related to authoritarianism.

The only outside variable that was constructed by the experimenter for the present research was the Interpersonal Rating Scale (38, 39) (IRS). Since it is a new experimental measure, its correlations will be examined separately. The correlation of .78 between the two subscales has already been interpreted as a lower bound to its reliability. An examination of their correlations with the other variables included in the experiment shows that there are no major differences in correlations between the two with the other variables. This contributes additional evidence that the two are essentially parallel. The moderate correlations with sex (2) social desirability (37), Cycloid Disposition (49), Cooperativeness (52), and Neuroticism (54), indicate that females tend to perceive others more positively; that the neurotic tends to perceive others as less positively evaluative; and that the cooperative person tends to see others more positively. Some of these effects, but not all, are likely to be dependent upon the social desirability response style being measured by the Interpersonal Rating Scale. The evidence is that the IRS is a relatively independent and reliable measure of a personality variable. Certainly its relationship to other variables ought to be investigated further. It is recommended, in the interest of administration and scoring time, that one or the other subscales be used and the other one dropped from the scale.

The ratings of parent attitudes are of particular interest. The

correlation between the rating of warmth of father (17) and warmth of mother (18) was fairly large (.50) as was the correlation between leniency of father (19) and leniency of mother (20) (.54). Warmth and leniency were more highly correlated within parent (.23 for father and .27 for mother) than between parents (warmth of father with leniency of mother .08 and warmth of mother with leniency of father .10). Thus, there was greater relationship for warmth and for leniency across parent than between warmth and leniency within parent. Also, the larger the number of brothers and sisters (16) that a person has the more he recalls having perceived his parents as cold (17, 18) while he was in high school (+.31 for father and +.23 for mother). On the other hand, significant correlations with Strictness are not found. Apparently, people from larger families perceive their parents as being relatively cold (probably because they do not have the time to give each child much attention), but the size of the family does not seem to have a consistent affect upon how strict or lenient the parents are perceived. There is also some tendency for girls to perceive their parents as being warmer.

Individuals who have a high outdoor interest (23), as measured by the Kuder Prederence Record, tend to perceive their parents as warmer (17, 18) than those receiving relatively lower scores. Also those who score highly on literary interest tend to perceive their parents as more lenient (19, 20). As might be expected there is a slight relationship between perceived warmth of parent and the Social Desirability Scale (37).

Several interesting relations were found with the Kuder Areas of Preference, although most of the correlations are quite low. One of the most surprising set of relations involved the computational (25) and

clerical (32) areas. For example, it was found that older students (1), students in a higher years of college (3), and students whose father's occupations had a high socio-economic rating (6) tended to have higher scores on social service (31). Females tended toward clerical interest. Individuals from larger communities (4) tended to be high on social service and persuasive (27) and low on clerical interests.

It was also found that individuals whose fathers and mothers are older tend to score higher on computational interest. There is some tendency for individuals who have more older brothers and sisters (16) to score lower on literary interest (29).

The correlations between the Kuder and the SCAT are also of interest. Expected relations were found to exist. Computational (25) and scientific (26) interest both correlated positively with the quantitative SCAT score (34) (.29 and .17, respectively), while artistic (28) and clerical interest (32) were negatively correlated (-.17 and -.19, respectively). Scientific (26) and literary (29) interests were the only areas of interest that were significantly correlated with the linguistic SCAT score (33) (.23 and .22, respectively).

Only two interest areas were correlated with social desirability. There were computational (25) and literary (29) (.20 and -.20, respectively) Apparently, interest in computational activities is socially desirable, and interest in literary activities is socially undesirable. Not only do people who have relatively higher literary interests tend to make the socially undesirable response, but they also rate "The Average Person" (38) and "People as a Whole" (39) in a negatively evaluative direction.

Only four of the Kuder scales show any relationship with the

California F scale (41), with Intolerance of Ambiguity (45), and with Acquiescence Response Style (44, 47, 48). They are as follows: Scientific (26), Literary (29), Social Service (31), and Clerical (32). Scientific and Literary correlated negatively with authoritarianism and intolerance of ambiguity and was unrelated to acquiescence response style. Social Service (31) tends to go positively with authoritarianism as measured by the content score (46) (.16) and negatively with acquiescence response set. This is a particularly interesting relationship because it is the only variable included in the study that had significant correlations on both scales but which were split with respect to sign. This is another evidence that authoritarianism content and acquiescence response style as measured by the California F scale are being confounded in the way it is usually scored and that they are two distinct and reliable components. Clerical interest is related positively to acquiescence response set and to intolerance of ambiguity and is unrelated to authoritarianism.

The relationships of the Kuder Preference Record scales to the scales on the Personality Inventory will be discussed in a later section dealing with the Personality Inventory.

Budner (1959, 1962) has reported some interesting results with his Intolerance-Tolerance for Ambiguity Scale (45). It will be informative to examine some of the relationships that this variable has with the other variables included in the present study. Most of the significant correlations that were found were small and just barely significant. There was some slight indication that the person who is intolerant of ambiguity has a larger number of older brothers (11), a fewer number of younger brothers (12), more sisters (13), less scientific interest (26), more clerical

interest (32), lower scores on the linguistic (33) and total (35) scores for the SCAT, more authoritarianism (41, 46), and more acquiescence response set (44, 47, 48). These findings are consistent with an interpretation of the individual who is intolerant of ambiguity. The individual who has more older brothers is apt to have things more structured for him and is required less frequently to confront ambiguous situations while he is developing. His interest would be drawn to those areas that are structured (clerical work) and he is apt to display a lack of interest in ambiguous fields (science). Intolerance of ambiguity correlates with authoritarianism and is like authoritarianism in that it correlates negatively with the linguistic and total scores of the SCAT.

Pettigrew's Category Width Scale (36) (Pettigrew, 1958) is a recent and promising measure of an interesting cognitive style, the width of categories that is characteristically employed by an individual in classifying objects. Although there is little information available on it, a number of investigations have demonstrated its value (Kogan & Wallach, 1960; Rosen, 1961; Wallach & Caron, 1959; Wallach & Kogan, 1959). The present research obtained some correlations with it and a number of other variables A consistent finding with a result reported by Pettigrew (1958) was that males obtain broader category width scores than do females. The point biserial correlation (with female coded high) between sex (2) and category width (36) was -.42. Also, individuals with large category width as opposed to those with narrow category width tend to rate their mother as colder (18), score higher on the quantitative scale of the SCAT (34), have less clerical interest (32), rate "The Average Person" less positively (38), and score lower on the Cooperative Scale (52). The findings also corroborate

those of Pettigrew in that no significant correlations were found with the California F scale (41). It is also of interest that the scale is not significantly correlated with social desirability (37), with acquiescence response set (44, 47, 48), or with intolerance of ambiguity (45). One might have supposed that the person who uses broad categories would tend to overlook fine nuances of difference between objects so as to form his broad categories and thus be intolerant of the ambiguity that would arise by considering the details and attempting to form them into classes. No implications for such a supposition is implied in the obtained correlation. The same relationships that exist above for category width also hold for sex. Since sex correlates highly with category width, it is somewhat questionable that any of the above relationships would hold for category width if sex were partialed out.

Another set of correlations to be examined are those that concern the interrelationships between the Guilford scales (Guilford, 1940; Guilford and Martin, 1943a; Guilford and Martin, 1943b) and the Maudsley Personality Inventory. On the basis of recent evidence (Becker, 1961) four of the Guilford scales were administered: C: Cycloid Disposition; R: Rhathymia; T: Thinking Introversion; and Co: Cooperativeness. Maudsley's Personality Inventory contains scales measuring Extroversion (E) and Neuroticism (N) and was also administered. The Guilford scales were derived through factor analysis. However, the scales as they were originally developed contained some overlapping items. This results in scales with built in intercorrelations between them (i.e., they are not experimentally independent). To rectify this problem so as to make the meaning of the intercorrelations obtained from the study more easily interpretable,

the overlapping items were randomly assigned to one scale or the other. The result was that correlations obtained between the modified C, R, and T scales should not be inflated as a result of experimental dependency. It was found that Cycloid Disposition (49) (i.e., emotional instability) was uncorrelated with Rhathymia (50) (i.e., happy-go-lucky), was moderately correlated with Thinking Introversion (51)(i.e., introspectiveness) (.37), and was negatively correlated with Cooperativeness (52) (-.40). The correlation of C (49) with Extroversion (53) is significant but low (-.20) and with Neuroticism (54) is extremely high (.82) as would be expected considering the overlap between the items consituting the C and N scales (cf. Appendix D). Rhathymia (50) was found to be uncorrelated with Thinking Introversion (51), Cooperativeness (52), and Neuroticism (54). It did correlate .82 with Extroversion (53). But again this extremely large correlation is not surprising considering the extent of overlap between the items constituting the two scales. T (51) was found to be uncorrelated with Co (52), to correlate negatively with Extroversion (53) (-.28), and to positively correlate with Neuroticism (54) (.33). Cooperativeness (52) was uncorrelated with Extroversion. And Neuroticism correlated negatively with Extroversion (53) and with Cooperativeness (52) (-.18 and -.44, respectively).

The findings in general indicate that the two second order factors, Extroversion (53) and Neuroticism (54), are fairly unrelated (-.18) and that Cycloid Disposition (49) has a large positive loading on Neuroticism while Cooperativeness (52) has a moderate, negative loading on it. Thinking Introversion (51), on the other hand, loads positively on Neuroticism (54) and negatively on Extroversion (53) as would be expected. Rhathymia

(50) has a large positive loading on Extroversion (53). The other loadings are virtually nil.

A number of significant correlations that will be interesting to look at are those of the Personality Inventory scales with other variables. Most of the relations that were found to be significant were small. So only trends can be interpreted from the correlations. Younger subjects (1) tended to get higher scores on Cycloid Disposition (49) (i.e., emotional instability) and Neuroticism (54). Females (2) tended to be more cooperative (52). People from larger communities (4) tended to be more extroverted (53). People whose fathers were in occupations which received a higher socio-economic rating (6) tended to be more neurotic (54) (-.18). Number of Sisters (13) was found to be positively related to emotional instability (49) and Thinking Introversion (51) (.16 and .16, respectively).

The greater the extent to which the father is older than the mother (21), the more emotionally unstable (49) the more introverted in thinking (51), the less cooperative (52), and the more neurotic (54) the child. It may be that there is a curvilinear relationship such that the less the father is older than the mother the better adjusted the child until the point where the mother is somewhat older than the father. The hypothesis would have to be explicitly investigated in another experiment.

There are some relationships between the scales in the Personality Inventory and the Kuder scores. Significant correlations involve primarily the personality scales C, R, E, and N. The more emotionally unstable (49) and neurotic (54) person tends to score low on computational (25) and clerical (32) and high on literary (29). The happy-go-lucky (50) and extroverted (53) person has less outdoor (23) and scientific (26) interest

and more mechanical (24) and persuasive (27) interest.

Some relationships between the personality variables measured on the Personality Inventory and scholastic aptitude measured by the SCAT were obtained. Extroverts (53) and persons high on Rhathymia (50) (i.e., happy-go-lucky, carefree) tend to score relatively lower on both the quantitative (34) and Linguistic (33) aptitudes. The person high on cooperativeness (52), on the other hand, tends to get a higher linguistic aptitude score (33).

The intercorrelations among the outside variables, although quite incidental to the present research, are of considerable interest. An attempt to broadly sample the "personality sphere" resulted in the inclusion of a heterogeneous sample of variables. Correlation coefficients were obtained between the biographical, aptitude, and personality measures which were included. The complex nature of the intercorrelations became apparent in the discussion of them. It is suggested that, as a subsequent research project, a factor analysis of the correlations be obtained. While the value of such a factor analytic experiment is of interest in its own right, such an analysis is not central to the present research. An attempt has been made in the present research to report some of the interrelationships that were obtained, incidentally, between the outside variables. A number of interesting relationships have been reported.

Chapter VI

SUMMARY

In recent years the emphasis in psychological investigations of interpersonal perception has shifted from the accuracy of such perceptions to the processes involved. The current interest seems to be directed toward the processes by which impressions of the personalities of others are formed. Theoretical considerations have led a number of investigators to posit an "implicit personality theory" or "lay theory of psychodynamics" for individuals through which impressions are formed. Thus, when an individual receives partial information about another person he is able to form a more complete impression of the other's personality according to his "theory" as to what traits are related to those that are perceived. A number of investigators have addressed the problem of the interrelationships that exist between traits. The usual procedure has been to present the subject with a number of traits that characterize an actual or hypothetical person and to ask the subject to infer what other traits the individual possesses. These studies may be characterized as investigations of trait implication or trait inference. In the present study a review of representative studies in this area has been presented.

The criticism has been made that research undertaken to date has done little to help in the understanding of interpersonal behavior in general, and that this state of affairs may have resulted from a failure to specify as goals the determination of (a) the qualities or verbal categories that people utilize in their impressions of others, (b) the determinants or correlates of these qualities, and (c) the consequences of different qualities for other types of behavior (Hastoff, Richardson, &

Dornbusch, 1958). The criticism may also be made that there has been a failure on the part of investigators in this area to deal with the role of individual differences. Results are generally developed for the average person.

The present research was principally directed toward (a) the measurement of individual differences in perceived trait relationships, (b) an examination of the structure of trait relationships for different types of individuals discovered, and (c) an investigation of the correlates or determinants of the different types of individuals discovered.

Two classes of measuring instruments were, therefore, selected and constructed, (a) instruments for measuring individual differences in perceived trait similarity and (b) instruments for measuring possible determinants or correlates. For the first class, parallel forms of a Trait Similarity Rating Scale were constructed. Each form consisted of 300 pairs of personality trait-names as items to be rated on an eight point scale as to perceived similarity-dissimilarity. The 300 items constituting the two forms were non-overlapping random samples from the 1,225 possible pairs arising from the inclusion of fifty trait-names. The measuring instruments constituting the second class were selected so as to assess as broadly as possible sociological, personality, and ability attributes of the individuals. Scores on the following were obtained: Kuder Preference Record; School and College Ability Test (SCAT); Category Width Scale; Social Desirability Scale; Interpersonal Rating Scale; California F scale; a negative California F scale; Authoritarianism Content; Acquiescence Response Set; Tolerance-Intolerance of Ambiguity Scale; Four Guilford Scales--Cycloid Disposition, Rhathymia, Thinking Introversion, and Cooper-

ativeness; Maudsley's Personality Inventory; and a Biographical Data Sheet containing a number of biographical variables relating to sociological and background attributes of the individual. The measuring instruments were administered and data collected from 262 subjects enrolled in introductory psychology at the University of Illinois.

A type of factor analysis over individuals recently formulated by Tucker and Messick (1960) was used in the analysis of individual difference in trait similarity ratings. The analysis was designed to yield different points of view about stimulus similarity. And in the present case it was utilized to determine different types of individuals or different points of view concerning perceived personality trait similarity. The analysis was applied to the sums of squares and sums of cross products matrices over individuals of the similarity-dissimilarity ratings. Since there were two forms of the Trait Similarity Rating Scale included for purposes of reliability estimation and because of capacity limitations of the computers as to the number of individuals that could be included it was necessary to conduct the analysis four times, once for each of four submatrices which were constructed from the ratings of two samples of fifty individuals on the two forms of the Trait Similarity Rating Scale. For each submatrix analyzed the analysis generated 300 item coefficients or measures of dissimilarity for pairs of trait-names and 262 individual coefficients on dimensions used to represent different points of view. An inspection and analysis of the dimensions obtained indicated that three for each submatrix were significant. Since there was some question concerning the congruence of the three dimensions obtained from each submatrix, six dimensions were retained for further analysis.

At this point individual coefficients had been obtained on six dimensions for each submatrix. These coefficients were not unique solutions however, since in the analysis the obtained dimensions were unique only within an orthogonal transformation. Therefore, since each of the dimensions for each analysis may be transformed, the question arose as to how this transformation could be defined most advantageously. An analysis was utilized, based on the procedure for obtaining coefficient alpha (cf. Cronbach, 1951), which (a) transformed the dimensions in each analysis, (b) developed composite dimensions based on the sums of the transformed dimensions, and (c) obtained coefficients alpha for each of the resultant composite dimensions. The composite dimensions were obtained in such a way that their reliability estimates were at a maximum. Three reliable orthogonal composite dimensions were obtained which confirmed the congruency of the three factors for each of the submatrices. Their reliabilities were .97, 194, and .87. Both individual and item coefficients were obtained on each of the three composite dimensions as part of the analysis. The dimensions were rotated to psychologyical meaningfulness using criteria similar to simple structure.

The meaning of the three rotated composite dimensions came out of a consideration of three types of information (a) the distribution of individual coefficients on the three composite dimensions, (b) the intercorrelations of the individual coefficients with the scores for individuals on the "outside" variables (i.e., the possible personality, sociological and ability determinants), and (c) the measures of dissimilarity for pairs of trait-names provided by the item coefficients.

All individuals received fairly large positive scores on the second

composite dimension or point of view. And there was an approximate balance between positive and negative coefficients on the first and third points of view. The indication was that the second point of view represented a type of "idealized individual" as to the perception of personality trait similarity and that the first and third points of view represented alteration or shift point of view from the second.

Additional definition of the meaning of the three points of view came from the intercorrelations of the individual coefficients with the "outside" variables. None of the variables correlated significantly with the first point of view, the correlations with the second point of view that did exist were small and indicated some slight tendency for the following to be somewhat higher on the second point of view: females, people with high linguistic ability, people who rate other people as "good," individuals from smaller communities, and people who rate their parents as "warm." People who tend to be more positively evaluative of others tend to score higher on the second dimension. An unexpected but interesting result occurred with the third point of view. Three variables were found to correlate moderately high with it, the linguistic score on the SCAT (-.57), authoritarianism as measured by the California F scale (.39), and scientific interest on the Kuder (-.24). Other smaller correlations are not of much assistance in defining the third point of view but they indicate some tendency for the person who shifts from the second point of view as defined by the third point of view to have more older brothers, to perceive his mother as warmer, to evaluate other people positively, to acquiesce, to be intolerant of ambiguity, and to be more cooperative. The indication was that the person who receives a large coefficient on the third point of

view to be the relatively less verbally intelligent authoritarian.

This interpretation was clarified and an interpretation of the other two points of view obtained by a consideration of the structure of item relations given by the item coefficients. Since trait similarity-dissimilarity indices were available for less than half of the possible pairings of the fifty trait-names, a conventional factor analysis of the item coefficients obtained for each of the three points of view in order to determine the structure of item relationships for each was impossible. However, a type of subjective factor analysis was conceived which would determine factors for the points of view. Since the first and third points of view represented alterations from the second point of view it was not meaningful to examine the structure of trait-name similarity for them before they were added on to the second point of view. A factoring of the second point of view yielded seven factors and the traits that defined each of the factors seemed to be related in a rather conventional way. The seven factors describing trait similarity relations that were obtained were as follows: "social desirability," "mental potency," "emotionality," "stability," "sociability," "sophistication," and "greedy."

The item coefficients of the first point of view as compared to those of the second point of view suggested that the first point of view represented a response set to mark toward the negative end of the rating scale. There was also some evidence for an alternate explanation involving misinterpretation of the scale. Since all of the coefficients of alteration for the first point of view were negative and rather small their affects were quite general and were dropped from further consideration.

The item coefficients for the third point of view were of particular interest considering that they represented alterations or shifts from the conventional point of view by the authoritarians. They were both positive and negative coefficients of shift but most of them were rather small. An analysis of them showed that the larger coefficients of shift were applied to the following traits: dishonest, weak, passive, submissive, rational, predictable, aggressive, irrational, unpredictable, domineering, defensive, and uninteresting. That is, the authoritarian's shift away from the conventional point of view is restricted to a rather small nucleus of traits and these traits definitely shift in the way that they are perceived as related to other traits.

The change to perceived relationships between the similarity between traits for the authoritarian was examined by adding the large coefficients of shift to the corresponding item coefficient for the second point of view and comparing the resultant structure of trait similarity for persons high on the third point of view to that for the corresponding items for persons high on the second point of view. It was found that domineering became more similar to positively evaluative traits such as honest, stable, and rational and became more dissimilar to negatively evaluative traits like tense, selfish, and insensitive. Rational shed some of its intellectual connotations (motivated, stable, intellectual) and was perceived as more similar to unpredictable, domineering, active, interesting, and brave. Predictable was perceived as more similar to active, emtoional, unselfish, intelligent, not submissive, less rational, brave, and interesting rather than similar to passive, unemotional, submissive, rational, and mature. Aggressive shifted from being perceived as similar to selfish, tense, and

unsociable to having a greater similarity to unselfish, honest, mature, and sociable. Although unrelated before the shift defensive became similar to strong, mature, interesting, honest, and graceful. Passive shifted from a dissimilarity to tense, unpredictable, dishonest, and interesting to being dissimilar to predictable, cooperative, and stable. Submissive on the second point of view was similar to weak and passive, and dissimilar to proud, competitive, and domineering. But on the third point of view it was perceived as not quite as weak, and not so opposite to proud, competitive, and domineering. After the shift weak was perceived as being not quite so submissive, and more dissimilar to typical and defensive. And, finally, uninteresting became similar to dishonest, not typical, not predictable, and not defensive.

The resultant perceived personality trait relationships for the authoritarian were considered in light of what is known about the authoritarian syndrome. And it was found that the perceived personality trait relations were consistent with what would be expected of the authoritarian.

In addition to the main study summarized above, and because the outside variables included in the present research represented a rather heterogeneous sampling of personality and biographical variables, the intercorrelations between the outside variables were noted.

Several interesting and important developments and results have been reported in the present research. Principal among these are the following:

1. The analytic procedure developed by Tucker and Messick (1960) based on a procedure developed by Eckart and Young (1936) has been successfully applied to the investigation of "implicit personality theories" and

appears to be a promising methodology for future investigations in this area. It provides "dimensions of variety among individuals, or different points of view about stimulus similarity," and yields item coefficients or measures of dissimilarity for pairs of stimuli for each point of view as well as individual coefficients on the dimensions.

2. Dimensions of individual differences in perceived personality trait similarity developed from a subsample of 50 individuals were found to adequately account for the perceived trait similarity ratings of the entire sample of 262 individuals from which they were sampled.

3. Individual differences in perceived personality trait similarity as measured by the Trait Similarity Rating Scale are such that they can be accounted for by a small number of reliable dimensions.

4. A procedure developed by Dr. Ledyard R Tucker[22] and based on the procedure for obtaining coefficient alpha was reported and utilized which determined composite factors which were maximally reliable for the case when several factor solutions for the same individuals on different variables are in existence.

5. Composite dimensions rotated orthogonally according to considerations similar to simple structure were found to represent meaningful points of view regarding perceived personality trait relationships. Three such reliable points of view were found. Considerations led to the interpretation of the three points of view as (a) a response set, (b) a conventional point of view, and (c) a shift from the conventional point of view to an authoritarian point of view.

6. An examination of the item coefficients led to the interpretation of

[22]Personal communication.

the first point of view as a response set to mark to the low end of the rating scale used in the present experiment.

7. A subjective factor analysis was conceived which determined the structure of the item relationships for the conventional point of view. From the subjective factor matrix seven factors were identified: "social desirability," "mental potency," "emotionality," "stability," "sociability, "sophistication," and "greedy." These factors seemed to account for the structuring of perceived trait relations or perceptual space for the person high on the conventional point of view.

8. The change in the perceptual space of the authoritarian was examined by adding the larger item coefficients for the third point of view to the corresponding items for the second or conventional point of view. Though the investigator had no preconception concerning the differences in the "implicit personality theory" between authoritarians and non-authoritarians, the data forced him to arrive at the following major conclusions:

a. One of the principal ways that individuals differ in their perceptions of the relationships between traits, and hence of other people, is a dimension that is closely related to what has been called authoritarianism.

b. The traits that are defined differently for the authoritarian are restricted to a relatively small number which are particularly meaningful to him.

c. The nature of the perceived personality trait relations that are unique for the authoritarian bears an additive relationship to that of the conventional or nonauthoritarian point of view according

to the model employed in the present analysis.

d. The present methodology and results contributed to a more thorough understanding of the perceived personality trait relationships or the "implicit personality theory" of the authoritarian personality.

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APPENDICES

Appendix A

Pairs of Trait-Names, Identified by Numbers, Constituting the Various Items of the Trait Similarity Rating Scale, Form A*

1) 34-26	51) 40-10	101) 33-41	151) 40-38	201) 37-17	251) 50-12
2) 46-49	52) 42-39	102) 18-39	152) 46-26	202) 08-35	252) 39-44
3) 39-06	53) 02-11	103) 18-25	153) 34-10	203) 21-18	253) 07-22
4) 44-21	54) 23-05	104) 39-49	154) 49-50	204) 15-14	254) 16-46
5) 49-04	55) 25-28	105) 18-02	155) 47-46	205) 08-11	255) 41-23
6) 16-03	56) 13-12	106) 08-15	156) 13-32	206) 28-45	256) 29-47
7) 06-37	57) 20-42	107) 15-11	157) 27-25	207) 10-18	257) 49-08
8) 41-48	58) 40-05	108) 38-29	158) 30-46	208) 39-19	258) 27-17
9) 12-20	59) 19-31	109) 13-26	159) 17-28	209) 30-13	259) 07-33
10) 18-47	60) 11-17	110) 11-46	160) 50-36	210) 07-40	260) 20-07
11) 20-48	61) 26-08	111) 12-23	161) 22-08	211) 36-32	261) 15-19
12) 22-42	62) 41-40	112) 14-38	162) 03-34	212) 14-28	262) 10-45
13) 36-22	63) 48-50	113) 29-09	163) 35-47	213) 25-36	263) 37-33
14) 42-47	64) 41-06	114) 32-46	164) 23-06	214) 12-09	264) 15-47
15) 15-01	65) 07-28	115) 23-16	165) 03-21	215) 45-40	265) 09-22
16) 08-33	66) 42-41	116) 38-31	166) 25-19	216) 26-43	266) 11-44
17) 31-14	67) 26-17	117) 09-39	167) 24-28	217) 49-09	267) 15-10
18) 30-50	68) 09-38	118) 38-25	168) 14-37	218) 46-31	268) 11-41
19) 39-10	69) 36-03	119) 30-41	169) 47-19	219) 10-37	269) 26-28
20) 25-37	70) 05-34	120) 38-43	170) 38-47	220) 45-08	270) 19-48
21) 06-25	71) 34-37	121) 47-23	171) 11-22	221) 05-03	271) 27-16
22) 43-01	72) 49-28	122) 29-37	172) 45-20	222) 17-10	272) 01-41
23) 09-04	73) 02-29	123) 08-46	173) 33-36	223) 18-24	273) 41-29
24) 11-04	74) 17-06	124) 47-12	174) 36-31	224) 29-36	274) 09-47
25) 15-40	75) 34-38	125) 45-13	175) 28-23	225) 49-47	275) 49-27
26) 48-15	76) 21-41	126) 10-46	176) 28-06	226) 35-28	276) 11-14
27) 49-26	77) 23-08	127) 48-14	177) 25-26	227) 19-22	277) 35-15
28) 26-44	78) 05-30	128) 32-01	178) 14-32	228) 17-43	278) 23-07
29) 47-16	79) 47-30	129) 43-29	179) 44-05	229) 34-21	279) 22-40
30) 19-38	80) 20-39	130) 12-35	180) 06-02	230) 44-36	280) 06-18
31) 06-45	81) 10-34	131) 48-17	181) 46-27	231) 41-03	281) 34-32
32) 40-46	82) 04-37	132) 36-37	182) 02-26	232) 03-27	282) 10-02
33) 42-10	83) 23-18	133) 33-17	183) 39-41	233) 45-35	283) 30-02
34) 21-22	84) 20-50	134) 14-42	184) 29-50	234) 41-07	284) 12-27
35) 26-30	85) 48-45	135) 45-16	185) 37-20	235) 26-10	285) 34-23
36) 33-05	86) 16-19	136) 33-03	186) 34-40	236) 19-02	286) 17-46
37) 34-30	87) 24-09	137) 21-04	187) 20-29	237) 04-34	287) 01-27
38) 16-43	88) 36-05	138) 26-22	188) 22-03	238) 25-31	288) 33-45
39) 42-32	89) 20-14	139) 43-25	189) 40-01	239) 16-38	289) 18-12
40) 01-08	90) 49-43	140) 26-39	190) 37-15	240) 18-34	290) 19-13
41) 24-11	91) 44-07	141) 34-01	191) 44-03	241) 02-32	291) 41-46
42) 47-02	92) 15-27	142) 06-11	192) 41-05	242) 25-50	292) 40-25
43) 12-25	93) 27-30	143) 16-36	193) 42-36	243) 25-08	293) 27-19
44) 16-02	94) 39-47	144) 07-37	194) 32-08	244) 01-10	294) 50-44
45) 31-39	95) 47-06	145) 41-14	195) 01-06	245) 07-24	295) 15-39
46) 15-28	96) 27-06	146) 26-07	196) 33-13	246) 34-41	296) 38-35
47) 40-17	97) 11-25	147) 43-11	197) 46-33	247) 38-26	297) 37-16
48) 08-09	98) 22-44	148) 43-09	198) 09-07	248) 37-48	298) 10-14
49) 29-22	99) 12-34	149) 19-44	199) 07-46	249) 01-25	299) 15-39
50) 05-35	100) 23-32	150) 33-43	200) 20-46	250) 48-02	300) 44-02

*Trait-names corresponding to the trait numbers are given in Table 2.

Appendix A (Continued)

Pairs of Trait-Names, Identified by Numbers, Constituting the Various Items of the Trait Similarity Rating Scale, Form B*

1)	27-22	51)	18-46	101)	03-14	151)	26-06	201)	11-34	251)	27-04
2)	10-03	52)	15-45	102)	10-33	152)	24-06	202)	15-46	252)	45-44
3)	46-48	53)	07-39	103)	32-41	153)	48-03	203)	26-41	253)	38-24
4)	30-33	54)	13-39	104)	35-25	154)	36-35	204)	05-18	254)	14-13
5)	41-17	55)	05-10	105)	31-06	155)	25-41	205)	50-27	255)	01-48
6)	01-45	56)	48-39	106)	44-01	156)	10-09	206)	05-38	256)	21-50
7)	14-36	57)	04-03	107)	14-06	157)	50-31	207)	49-25	257)	02-41
8)	40-04	58)	19-45	108)	32-50	158)	02-50	208)	06-40	258)	32-07
9)	12-01	59)	38-41	109)	08-44	159)	45-14	209)	39-23	259)	37-50
10)	48-24	60)	32-11	110)	32-04	160)	09-32	210)	36-40	260)	35-41
11)	19-40	61)	01-49	111)	27-10	161)	16-17	211)	07-05	261)	44-16
12)	24-29	62)	16-48	112)	43-03	162)	27-11	212)	32-33	262)	10-35
13)	20-19	63)	11-20	113)	27-05	163)	01-31	213)	25-07	263)	20-36
14)	31-45	64)	11-49	114)	16-31	164)	35-16	214)	04-38	264)	03-02
15)	36-23	65)	46-37	115)	47-48	165)	04-16	215)	21-17	265)	28-21
16)	10-38	66)	06-15	116)	24-19	166)	45-24	216)	29-27	266)	18-49
17)	08-31	67)	02-31	117)	32-10	167)	48-13	217)	27-13	267)	04-35
18)	47-10	68)	04-24	118)	07-15	168)	24-05	218)	12-40	268)	23-02
19)	07-11	69)	47-08	119)	35-03	169)	03-07	219)	39-32	269)	26-27
20)	37-21	70)	29-35	120)	02-07	170)	01-39	220)	25-48	270)	27-02
21)	36-38	71)	33-06	121)	16-18	171)	30-45	221)	05-42	271)	34-50
22)	11-42	72)	44-15	122)	21-08	172)	42-31	222)	49-33	272)	07-42
23)	23-17	73)	08-19	123)	09-44	173)	11-29	223)	43-42	273)	33-48
24)	22-41	74)	02-12	124)	48-34	174)	23-04	224)	36-12	274)	24-20
25)	48-12	75)	20-44	125)	39-34	175)	30-17	225)	23-43	275)	31-32
26)	33-40	76)	20-13	126)	34-02	176)	33-39	226)	10-19	276)	28-39
27)	48-23	77)	38-39	127)	10-23	177)	45-03	227)	12-42	277)	26-31
28)	21-12	78)	47-45	128)	28-07	178)	27-37	228)	43-46	278)	42-35
29)	22-24	79)	04-15	129)	26-03	179)	35-07	229)	11-35	279)	03-17
30)	40-11	80)	08-30	130)	20-28	180)	02-45	230)	38-27	280)	12-10
31)	14-24	81)	28-33	131)	46-02	181)	32-40	231)	49-20	281)	46-29
32)	20-25	82)	20-03	132)	13-17	182)	04-42	232)	39-24	282)	49-30
33)	10-24	83)	42-23	133)	35-02	183)	32-30	233)	43-02	283)	16-15
34)	14-29	84)	38-21	134)	24-40	184)	44-06	234)	34-22	284)	23-13
35)	25-42	85)	47-27	135)	05-01	185)	08-04	235)	18-27	285)	33-04
36)	39-05	86)	26-35	136)	01-23	186)	19-06	236)	44-46	286)	36-48
37)	39-25	87)	48-35	137)	20-15	187)	13-50	237)	03-42	287)	49-06
38)	25-46	88)	03-38	138)	08-06	188)	09-26	238)	45-05	288)	13-40
39)	06-38	89)	38-42	139)	27-39	189)	07-12	239)	38-49	289)	24-46
40)	01-21	90)	45-25	140)	13-24	190)	27-21	240)	32-26	290)	40-12
41)	16-05	91)	48-11	141)	27-43	191)	10-20	241)	04-50	291)	41-13
42)	22-28	92)	48-10	142)	07-48	192)	28-09	242)	31-18	292)	27-48
43)	42-02	93)	35-24	143)	02-04	193)	47-04	243)	47-40	293)	38-32
44)	12-17	94)	48-08	144)	30-20	194)	20-40	244)	09-33	294)	47-28
45)	14-05	95)	20-27	145)	16-06	195)	28-34	245)	26-29	295)	45-38
46)	11-19	96)	10-35	146)	25-23	196)	39-40	246)	38-17	296)	50-07
47)	18-11	97)	50-08	147)	26-05	197)	24-36	247)	28-03	297)	12-22
48)	45-26	98)	25-16	148)	44-31	198)	28-10	248)	40-31	298)	04-26
49)	25-30	99)	24-31	149)	38-22	199)	18-14	249)	31-48	299)	13-38
50)	13-25	100)	36-11	150)	43-22	200)	49-24	250)	22-45	300)	47-41

*Trait-names corresponding to the trait numbers are given in Table 2.

Appendix B

Classifications and Ratings for the Occupation Status Characteristic*

Rating	Professionals	Proprietors & Managers	Business Men	Clerks and Kindred Workers
1	Lawyers, doctors dentists, engineers, high-school superintendants, veterinarians, ministers (with D.D.), chemists etc. with post-graduate training, architects.	Businesses valued at $75,000 and over.	Regional and divisional managers of large financial and industrial enterprises.	Certified Public Accountants.
2	High-school teachers, trained nurses, chiropodists, chiropractors, undertakers, ministers (some training), newspaper editors, librarians (grad.).	Businesses valued at $20,000 to $75,000.	Ass't managers and office and dep't managers of large businesses, ass'ts to executives, etc.	Accountants, salesmen of real estate, of insurance, postmasters.
3	Social workers, grade-school teachers, optomotrists, librarians (not grad.), undertakers, ministers (no training).	Businesses valued at $5,000 to $20,000.	All minor officials of business.	Auto salesmen, bank clerks & cashiers, postal clerks, secretaries to executives, supervisors of R.R., telephone, etc., justices of the peace.
4		Businesses valued at $2,000 to $5,000.		Stenographers, bookkeepers, rural mail clerks, R.R. ticket agents, sales people in dry goods store, etc.
5		Businesses valued at $500 to $2,000.		Dime store clerks, hardware salesmen, beauty operators, telephone operators.

Appendix B (Continued)

Rating	Professionals	Proprietors & Managers	Business Men	Clerks and Kindred Workers
6		Businesses valued at less than $500.		
7				

Classifications and Ratings for the Occupation Status Characteristic*

Rating	Manual Workers	Protective & Service Workers	Farmers
1			Gentleman farmers
2			Large farm owners, farm owners.
3	Contractors		
4	Factory foremen, watchmakers, electricians, plumbers, carpenters—own business.	Dry cleaners, butchers, sheriffs, RR engineers and conductors.	
5	Carpenter, plumbers electricians (apprentice), timekeepers, linemen, telephone or telegraph, radio repairmen, medium skill workers.	Barbers, firemen, butcher's apprentices, practical nurses, policemen, seamstresses, cooks in restaurant, bartenders.	Tenant farmers.
6	Moulders, semiskilled workers, assistants to carpenter, etc.	Baggage men, night policemen and watchmen, taxi and truck drivers, gas station attendants, waitresses in restaurant.	Small tenant farmers.
7	Heavy labor, migrant work, odd-job men.	Janitors, scrubwomen, newsboys.	Migrant farm workers.

*cf. pp. 140-141 of Warner, W. L., Meeker, M., and Eells, K., Social Class in America, Science Research Associates, Inc., Chicago, 1949.

Appendix C

The PI's Extroversion (E) Scale and Scoring Key and the Numbers of the Corresponding Items in Maudsley's Personality Inventory and in Guilford's Personality Inventories*

PI Item Number	Maudsley's Personality Inventory Item Number	STDCR Item Number	Scale T, C, or R	E Key**
1	14	45	R	No
14	69	36	R	No
16	79	128	R	Yes
23	41	26	R	No
27	37	172	R, C	Yes
29	1	2	R	No
35	2	160	R	Yes
49	20	46	R	No
65	57	112	T, R	Yes
73	75	17	R	No
75	13	118	R	Yes
99	3	61	R	Yes
137	31	113	T, R	No
149	9	87	T, R	Yes
179	6	90	R	Yes
184	73	5	T, R	No
187	61	73	R	Yes
189	66	150	R	Yes
202	23	77	R	Yes
	46	130		Yes

		GAMIN Item Number	
	47	30	Yes
	44	110	Yes
	56	161	Yes
	51	174	Yes

*Nineteen of the twenty-four items comprising the E scale in Maudsley's Personality Inventory are included in the PI by virtue of their belonging to one or more of the T, C, or R scales from Guilford's "An Inventory of Factors STDCR." The content of the five items not included is given in Appendix E.

**Scoring: Yes or No = 2 points; ? = 1 point.

Appendix D

The PI's Neuroticism (N) Scale and Scoring Key and the Numbers of the Corresponding Items in Maudsley's Personality Inventory and in Guilford's Personality Inventories*

PI Item Number	Maudsley's Personality Inventory Item Number	STDCR Item Number	Scale T, C, or R	E Key**
7	16	52	C	Yes
9	68	65	C	Yes
17	76	117	C	Yes
20	32	152	T, C	Yes
21	50	141	C, R	Yes
38	48	144	C, R	Yes
46	54	24	T, C, R	Yes
79	25	60	C	Yes
82	35	86	C	Yes
89	18	58	C	Yes
101	63	50	C	Yes
113	39	159	C	Yes
121	26	59	C	Yes
125	27	72	T	Yes
131	71	22	T, C	Yes
144	11	49	T, C	Yes
165	4	44	C, R	Yes
169	65	6	T, C, R	Yes
183	42	155	C	Yes
195	38	169	T, C	Yes
	64	51		Yes
	10			Yes
	17			Yes
	59			Yes

*Twenty of the twenty-four items comprising the N scale in Maudsley's Personality Inventory are included in the PI by virtue of their belonging to one or more of the T, C, or R scales from Guilford's "An Inventory of Factors STDCR." The content of the four items not included is given in Appendix E.

**Scoring: Yes or No = 2 points; ? = 1 point.

Appendix E

E & N Items from Maudsley's Personality Inventory not Appearing in PI (Identified by Maudsley's item number)

10. Do you often feel disgruntled? (N)

17. Are you touchy on various subjects? (N)

44. Would you rate yourself as a talkative individual? (E)

46. Would you be very happy if you were prevented from making numerous social contacts? (E)

47. Are you happiest when you get involved in some project that calls for rapid action? (E)

51. Do other people regard you as a lively individual? (E)

56. Do you generally prefer to take the lead in group activities? (E)

59. Do you have periods of such great restlessness that you cannot sit long in a chair? (N)

64. Are you often troubled about feelings of guilt? (N)

Appendix F

Random Assignment of Overlapping Items in Guilford's C, R, & T Scales to Single Scales to Achieve Experimentally Independent Scales

PI	C&R	Scale Assignment	PI	R&T	Scale Assignment	PI	C&T	Scale Assignment	PI	C&R & T	Scale Assignment
21	141	C	28	82	R	4	124	T	46	24	T
27	172	R	45	148	R	11	29	T	169	6	C
34	91	R	46	24	T	20	152	T	198	8	R
36	48	R	65	112	R	46	24	T			
38	144	R	86	18	R	47	120	C			
46	24	T	107	13	T	81	116	T			
58	109	R	108	173	T	131	22	C			
70	164	R	118	55	T	143	134	T			
77	10	R	122	106	T	144	49	T			
95	96	C	126	102	R	145	132	C			
111	69	R	137	113	T	147	103	C			
116	162	C	146	85	T	158	147	T			
120	80	C	149	87	R	169	6	C			
138	62	C	152	56	T	170	9	T			
156	57	R	154	92	T	195	169	C			
165	44	C	160	4	R	198	8	R			
169	6	C	169	6	C						
185	39	R	174	114	R						
197	53	C	184	5	T						
198	8	R	198	8	R						
			199	123	T						

Appendix G

The PI's Experimentally Independent Cycloid Disposition (C) Scale* Scoring Key, and the Numbers of the Corresponding Items in "An Inventory of Factors STDCR."**

PI Item Number	STDCR Item Number	Key***	PI Item Number	STDCR Item Number	Key
5	163	Yes	103	14	Yes
7	52	Yes	105	12	Yes
8	137	Yes	112	67	Yes
9	65	Yes	113	159	Yes
10	145	Yes, ?	116	162	Yes
17	117	Yes	120	80	Yes
21	141	Yes	121	59	Yes
26	167	Yes	124	75	Yes
31	15	Yes	127	122	Yes
33	154	Yes	131	22	Yes
43	153	Yes	138	62	Yes
47	120	Yes	142	143	Yes, ?
52	78	Yes	145	132	Yes
53	33	Yes, ?	147	103	Yes
54	170	Yes	148	140	No, ?
56	93	Yes	150	111	Yes
57	165	No	159	76	No
79	60	Yes	164	95	Yes, ?
82	86	Yes	165	44	Yes, ?
87	41	Yes	167	131	Yes
88	138	No, ?	169	6	Yes
89	58	Yes, ?	183	155	Yes, ?
90	32	Yes, ?	192	64	Yes
91	129	Yes	194	127	Yes
95	96	Yes, ?	195	169	Yes
98	121	Yes, ?	197	53	Yes
101	50	Yes			

*A high score indicates emotional instability as opposed to emotional stability and evenness.

**For overlapping items included on the original C scale but not on this experimentally independent one, see Appendix F.

***Each item answered in the keyed direction received a weight of unity.

Appendix H

The PI's Experimentally Independent Rhathymia (R) Scale,* Scoring Key, and the Numbers of the Corresponding Items In "An Inventory of Factors STDCR."**

PI Item Number	STDCR Item Number	Key***	PI Item Number	STDCR Item Number	Key
1	45	No	83	47	Yes (2)
12	151	No	86	18	Yes
14	36	No	94	168	No
16	128	Yes	97	19	Yes
23	26	No	99	61	Yes
27	172	Yes	100	16	Yes
28	82	No (2)	111	69	No (2)
29	2	No	114	125	Yes
34	91	No	123	23	No
35	160	Yes	126	102	No
36	48	Yes	149	87	Yes (2)
38	144	Yes	151	110	Yes
44	31	Yes	156	57	Yes
45	148	Yes	160	4	Yes (2)
49	46	No (2)	163	42	No
51	97	No	172	11	No
55	100	No	174	114	Yes
58	109	Yes	179	90	Yes
65	112	Yes (2)	185	39	Yes (2)
66	81	No	187	73	Yes (2)
68	119	Yes	189	150	Yes
69	107	Yes	190	27	Yes
70	164	Yes	198	8	Yes (2)
73	17	No	202	77	Yes (2)
75	118	Yes	203	98	No
77	10	Yes			

*A high Score indicates a happy go lucky, carefree, unconcerned position.

**For overlapping items included on the original R scale but not on this experimentally independent one, see Appendix F.

***Each item answered in the keyed direction received a weight of unity except where there is a weight in parentheses in which case it received that weight.

Appendix I

The PI's Experimentally Independent Thinking Introversion (T) Scale,* Scoring Key, and the Numbers of the Corresponding Items in "An Inventory of Factors STDCR."**

PI Item Number	STDCR Item Number	Key***	PI Item Number	STDCR Item Number	Key
4	124	Yes	108	173	No (2)
11	29	Yes	118	55	Yes
19	135	Yes	122	106	No
20	152	Yes	125	72	No
24	105	Yes (2)	137	113	Yes
30	30	Yes (2)	143	134	Yes (2)
37	84	Yes	144	49	Yes (2)
39	174	No	146	85	Yes
41	101	Yes (2)	152	56	Yes
46	24	Yes	154	92	No
48	68	Yes (2)	155	74	Yes (2)
50	175	No	158	147	No (2)
59	156	Yes (2)	161	71	Yes
61	20	Yes	170	9	Yes
63	43	Yes (2)	181	136	Yes
74	104	Yes	182	161	Yes (2)
80	21	No	184	5	Yes
81	116	Yes (2)	196	99	Yes (2)
107	13	Yes	199	123	No

*A high score indicates introspectiveness, reflectiveness.

**For overlapping items included on the original T scale but not on this experimentally independent one see Appendix F.

***Each item answered in the keyed direction received a weight of unity except where there is a weight in parentheses in which case it received that weight.

Appendix J

The PI's Experimentally Independent Cooperativeness (Co) Scale*, Scoring Key, and the Numbers of the Corresponding Items in "The Guilford-Martin Personnel Inventory."

PI Item Number	Guilford-Martin Item Number	Key**	PI Item Number	Guilford-Martin Item Number	Key
2	121	no	119	108	no (2)
3	7	no (2)	128	46	yes
6	69	no (2)	129	82	no
13	73	no	130	113	no (2)
15	124	no (2)	132	85	no (2)
18	93	yes (2)	133	51	no (2)
22	92	no (2)	134	135	no
25	128	no (2)	135	147	no (2)
32	96	no	136	56	no (2)
40	11	no,?	139	67	no (2)
42	61	no (2)	140	99	no (2)
60	27	no (2)	141	101	no (2)
62	18	no (2)	153	78	no (2)
64	8	no, ? (2)	157	74	no,? (2)
67	127	no	162	89	no (2)
71	77	yes, ? (2)	166	137	no (2)
72	95	no (2)	168	146	no (2)
76	58	no (2)	171	23	no
78	141	no (2)	173	36	no
84	35	no (2)	175	80	no (2)
85	109	no	176	45	no, ?
92	75	yes	177	32	no (2)
93	142	no	178	72	no
96	120	no	180	16	no
102	60	no (2)	186	139	no (2)
104	54	no (2)	188	125	no (2)
106	103	no (2)	191	84	no
109	53	no (2)	193	34	no
110	65	no (3)	200	130	no
115	98	no (2)	201	62	no
117	70	no (2)	204	123	no

* A high score indicates cooperativeness or tolerance vs. fault finding, overcriticalness.

** Each item answered in the keyed direction received a weight of unity, except where there is a weight in parentheses in which case it received that weight.

Appendix K

Corresponding Positive and Negative Items from the California F Scale Included in the Public Opinion Questionnaire

Positive Item Number	Negative Item Number
1	29
2	30
3	31
5	32
6	33
7	34
8	35
11	36
12	37
16	38
17	39
19	40
24	41
26	42
27	43
28	44

Appendix L

Derivation of Independent Formulas for Content and Acquiescence Response Set for Personality Tests Based upon Helmstadter's "Postulated Knowledge Procedure"

F_a = number of favorable or positive items agreed with by examinee.

U_a = number of unfavorable or negative items agreed with by examinee.

U_d = number of unfavorable or negative items disagreed with by examinee.

N_f = number of items keyed favorable or positive.

N_u = number of items keyed unfavorable or negative.

B_f = number of favorable items which the examinee agrees with on the basis of content.

B_u = number of unfavorable items which the examinee disagrees with on the basis of content.

P_a = probability that an examinee will respond "agree" to an item that is not marked on the basis of content.

P_d = probability that an examinee will respond "disagree" to an item that is not marked on the basis of content.

The following four statements define the postulated knowledge model:

$$F_a = B_f + P_a(N_f - B_f) \tag{1}$$

$$U_d = B_u + P_d(N_u - B_u) \tag{2}$$

$$P_a + P_d = 1 \quad \text{assuming a response to every item} \tag{3}$$

$$\frac{B_f}{N_f} = \frac{B_u}{N_u} \quad \text{assuming items are of equal clarity, definiteness, and polarity.} \tag{4}$$

Solving the above equations simultaneously gives

$$\frac{F_a}{N_f} = \frac{B_f}{N_f} + P_a\left(\frac{N_f}{N_f} - \frac{B_f}{N_f}\right) \tag{5}$$

Appendix L (Continued)

$$\frac{U_d}{N_u} = \frac{B_u}{N_u} + (1 - P_a)\left(\frac{N_u}{N_u} - \frac{B_u}{N_u}\right) \tag{6}$$

$$\frac{U_d}{N_u} = \frac{B_f}{N_f} + (1 - P_a)\left(1 - \frac{B_f}{N_f}\right) \tag{7}$$

$$\frac{U_d}{N_u} = \frac{B_f}{N_f} + \left(1 - \frac{B_f}{N_f}\right) - P_a\left(1 - \frac{B_f}{N_f}\right) \tag{8}$$

Subtracting Equation (8) from Equation (5) yields

$$\frac{F_a}{N_f} - \frac{U_d}{N_u} = 2P_a\left(1 - \frac{B_f}{N_f}\right) - \left(1 - \frac{B_f}{N_f}\right) \tag{9}$$

Rearranging terms and solving for P_a, the probability that a particular examinee will acquiesce when he does not respond to the content of an item, gives

$$2P_a - 1 = \frac{\frac{F_a}{N_f} - \frac{U_d}{N_u}}{1 - \frac{B_f}{N_f}} \tag{10}$$

Letting the coefficient $2P_a - 1$ represent acquiescence response set, S_1, because it varies between -1 and +1 and setting the ratio $\frac{B_f}{N_f}$ equal to C gives

$$S_1 = \frac{\frac{F_a}{N_f} - \frac{U_d}{N_u}}{1 - C} \tag{11}$$

Adding Equation (7) to Equation (5) gives

$$\frac{F_a}{N_f} + \frac{U_d}{N_u} = 2\frac{B_f}{N_f} + \left(1 - \frac{B_f}{N_f}\right) \tag{12}$$

$$= \frac{B_f}{N_f} + 1$$

Appendix L (Continued)

Solving for $\frac{B_f}{N_f}$ and rearranging terms and letting $C = \frac{B_f}{N_f}$ gives

$$C = \frac{F_a}{N_f} + \frac{U_d}{N_u} - 1 \qquad (13)$$

The coefficient C, it can be seen, varies between -1 and +1 as does S_1. The fact that the ratio $\frac{B_f}{N_f}$ can equal a negative number raises some interesting problems as discussed in the text of this paper and has led Messick (1961) to consider only the absolute value of C in determining acquiescence response set. In this paper this latter coefficient has been called S_2.

Appendix M

Positive and Negative Items in the Tolerance-Intolerance of Ambiguity Scale Contained in the Public Opinion Questionnaire and the Corresponding Items in Budner's (1959) Scale

Public Opinion Questionnaire: T-IAS		Budner's T-IAS	
Positive Item No.	Negative Item No.	Positive Item No.	Negative Item No.
45		7	
	46		13
	47		16
	48		11
49		1	
50		8	
51		4	
	52		10
53		5	
	54		9
55		3	
	56		12
57		6	
58		2	
	59		15
	60		14

Appendix N

MMPI Item Numbers Corresponding to the Item Numbers Comprising Edward's (1957) 39-item, Social Desirability Scale and the Scoring Key

Social Desirability Scale Item Number	MMPI Item Number	Key
1	7	T
2	18	T
3	32	F
4	40	F
5	42	F
6	43	F
7	54	T
8	107	T
9	138	F
10	148	F
11	156	F
12	158	F
13	163	T
14	169	T
15	171	F
16	186	F
17	218	F
18	241	F
19	245	F
20	247	F
21	252	F
22	257	T
23	263	F
24	267	F
25	269	F
26	286	F
27	301	F
28	321	F
29	335	F
30	337	F
31	352	F
32	371	T
33	383	F
34	424	F
35	431	F
36	439	F
37	528	T
38	549	F
39	555	F

Appendix O

Evaluative Scales in the Order that they Appear in the Interpersonal Rating Scale and with the Positively Evaluative Adjective Appearing Always to the Left

Positively Evaluative	Negatively Evaluative
Rational	Irrational
Sacred	Profane
Graceful	Awkward
Moral	Immoral
*Intelligent	*Unintelligent
*Nice	*Awful
*Valuable	*Worthless
*Fair	*Unfair
Unselfish	Selfish
*Successful	*Unsuccessful
*Important	*Unimportant
Wise	Foolish
*Sociable	*Unsociable
Clean	Dirty
Beautiful	Ugly
*Kind	*Cruel
*Good	*Bad
*Honest	*Dishonest
*High	*Low
*Reputable	*Disreputable
Wholesome	Unwholesome
*Pleasant	*Unpleasant
Grateful	Ungrateful
Optimistic	Pessimistic
Sane	Insane

*These thirteen scale have the positively evaluative adjective occurring to the right and the negatively evaluative adjective appearing to the left in the Interpersonal Rating Scale.

Appendix P

Mathematical Notes on the Analysis of Individual Differences In Trait Similarity Ratings

1. $x_{f(jk)i}$ = ratings of similarity between trait-names j and k contained in Form f of the Trait Similarity Rating Scale by individual i

   Where: i = individuals in total sample = 1, 2, . . ., 262

   j, k = trait-names, = 1, 2, . . ., 50

   (jk) = pairs of trait-names (two nonoverlapping random samples of 300 of the 1,225 pairs for complete paired comparison data of 50 trait-names were taken to construct two parallel forms of the Trait Similarity Rating Scale).

2. X_f = a matrix containing the ratings $x_{f(jk)i}$ and having 300 rows for the pairs of trait-names in Form f and 262 columns for the total sample of individuals.

   X_{fh} = a 300 x 50 submatrix containing the ratings of trait similarity for the random subsample h of fifty individuals on the 300 items contained in Form f of the Trait Similarity Rating Scale. It consists of selected columns of X_f corresponding to the individuals randomly selected as part of Subsample h. X_{fh} is to be represented as the product of three matrices.

   $X_{fh} = U_f \Gamma_f W_{fh}$

   Where: U_f = a 300 x 300 orthogonal matrix ($U'U = I$)

   Γ_f = a 300 x 50 matrix containing principal roots, $\sqrt{\gamma_m}$, as diagonal entries in an upper left section and zeros elsewhere

   W_{fh} = a 50 x 50 orthogonal matrix ($W_{fh}'W_{fh} = I$) .

Appendix P (Continued)

3. P_{fh} = $X_{fh}'X_{fh}$ = a 50 x 50 matrix of sums of squares and sums of cross products of the columns of X_{fh}. It is also equal to the following:

$= W_{fh}'\Gamma_f'U_f'U_f\Gamma_f W_{fh}$

$= W_{fh}'\Gamma'_f\Gamma_f W_{fh}$ (since U'U = I)

$= W_{fh}'\beta_f W_{fh}$ (letting $\Gamma_f'\Gamma_f = \beta_f$)

Where: β_f = a 50 x 50 diagonal matrix containing as diagonal entries $\beta_{fm} = \gamma_{fm}^2$

Since P_{fh} is a symmetric matrix, W_{fh} is an orthogonal matrix, and β_f is a diagonal matrix, this equation is in standard form for the diagonal entries in β_f to be characteristic roots and the rows of W_{fh} to be corresponding characteristic vectors of P_{fh}.

4. Eckart and Young (1938) have demonstrated that X_{fh} can be approximated in a least squares sense by an r dimensional matrix $\hat{X}_{fhr}$ when

X_{fhr} = $U_{fr}\Gamma_r W_{fhr}$

Where:

$\hat{X}_{fhr}$ = a 300 x 50 matrix containing $\hat{x}_{f(jk)i}$

U_{fr} = a 300 x r section of an orthogonal matrix formed by using the first r columns of U_f.

Γ_{fr} = a r x r diagonal matrix formed by using the first r principal roots γ_{fm} (square roots of the characteristic roots, β_{fm})

Appendix P (Continued)

W_{fhr} = an r x 50 section of an orthogonal matrix formed by using the first r rows of W_{fh}.

5. A_{fhr} = $50^{1/2} W_{fhr}$ = an r x 50 matrix of individual coefficients, a_{fmi} on the principal axes of matrix X_{fh} rescaled such that their root mean squares equal unity (i.e., $1/50\ A_{fhr} A_{fhr}' = I$). Thus the size of the individual coefficients is rendered independent of sample size.

6. U_{fr} = $X_{fh} W_{fhr}' \Gamma_r^{-1}$ Note: U_{fr} is not directly obtainable from the characteristic roots of P_{fh}; however, it can be obtained indirectly by the above equation which utilized the matrix of ratings, X_{fh}.

7. Y_{fr} = $U_{fr} \Gamma_{fr} 50^{-1/2}$ = a 300 x r matrix of item coefficients, $y_{f(jk)m}$, on the principal axes m of matrix X_{fh}.

8. $\hat{X}_{fhr}$ = $Y_{fr} A_{fhr}$

Y_{fr} and A_{fhr} have been defined such that Y_{fr} postmultiplied by A_{fhr} produces $\hat{X}_{fhr}$.

9. Given Y_{fr} and X_f, it is desired to find $(A_r)_{fh}$ containing individual coefficients, a_{mi}, for the total sample such that $\hat{X}_{fr}$ = $Y_{fr}(A_r)_{fh}$ is a least squares fit to X_f. The solution gives

$$(A_r)_{fh} = (Y_{fr}' Y_{fr})^{-1} Y_{fr}' Y_f$$
$$= H_{fr}' X_f$$

Where:

$$H_{fr}' = (Y_{fr}' Y_{fr})^{-1} Y_{fr}'$$

Appendix P (Continued)

$$= (50^{-1/2} \Gamma_{fr} U_{fr}' U_{fr} \Gamma_{fr} 50^{-1/2})^{-1} Y_{fr}'$$

$$= 50 \Gamma_{fr}^{-2} Y_{fr}'$$

Note that

$$H_{fr}' X_{fh} = 50 \Gamma_{fr}^{-2} Y_{fr}' X_{fh}$$

$$= 50 \Gamma_{fr}^{-2} 50^{-1/2} \Gamma_{fr} U_{fr}' X_{fh}$$

$$= 50^{1/2} \Gamma_{fr}^{-1} \Gamma_{fr} W_{fhr}$$

$$= A_{fhr}$$

Computationally, then, both $(A_r)_{fh}$ and A_{fhr} can be obtained by first finding the coefficient matrix H_{fr}' and then post-multiplying by the matrices of raw ratings, X_f and X_{fh}, respectively.

10. Having obtained $\hat{X}_{fhr}$ and $\hat{X}_{fr}$, it is possible to define two error of approximation matrices as follows:

E_{fhr} = $X_{fh} - \hat{X}_{fhr}$ = a 300 x 50 matrix containing $e_{fh(jk)i}$ the errors of approximating X_{hf} with $\hat{X}_{fhr}$

E_{fr} = $X_f - \hat{X}_{fr}$ = a 300 x 262 matrix containing $e_{f(jk)i}$ the errors of approximating X_f with $\hat{X}_{fr}$.

11. Having obtained the error of approximation matrices it is possible to obtain a root mean square error for each individual. The following matrices are defined:

$RMSE_{fhr}$ = a 1 x 50 matrix containing the total root mean squared errors over items for individuals in submatrix fh on whom

Appendix P (Continued)

the analysis was generated.

$RMSE_{fh'r}$ = a 1 x 50 matrix containing the total root mean squared errors over items for individuals in submatrix fh' (where h' is the alternate subscript to h and where $h' \neq h$) on whom the analysis was not generated.

$RMSE_{fr}$ = a 1 x 262 matrix containing the total root mean squared errors over items for individuals in the total sample.

Appendix Q

Mathematical Notes on the Procedure for Obtaining Coefficients Alpha and Composite Item and Individual Coefficients

1. The four 4 x 262 matrices $(A_r)_{fh}$ obtained from the analyses of the submatrices X_{fh} may be combined to form one 4r x 262 supersectional matrix A* with elements a_{mig}.

   Where: m = principal axis = 1, 2, . . ., r

   i = individual = 1, 2. . . ., 262

   g = group (one group corresponding to each one of the submatrices as follows: 1 = AI; 2 = AII; 3 = BI; and 4 = BII)

$$A^* = \begin{bmatrix} (A_r)_{AI} \\ (A_r)_{AII} \\ (A_r)_{BI} \\ (A_r)_{BII} \end{bmatrix} = \begin{bmatrix} (A_r)_1 \\ (A_r)_2 \\ (A_r)_3 \\ (A_r)_4 \end{bmatrix}$$

2. Individual coefficients, b_{pig}, on a transformed factor p for each of the groups g may be obtained from the a_{mig} by

   $b_{pig} = \sum_m a_{mig} w_{pmg}$

   Note: p is used to indicate the several possible composite scores; the following development applies to each value of p.

   w_{pmg} = the weight for the transformed factor p on the principal axis m in group g.

3. A composite score for each individual i over all groups g may be obtained,

   $b_{pi.} = \sum_g b_{pig}$

Appendix Q (Continued)

4. The covariance between individual coefficients on transformed factors for group g and group g' is

$$c_{pgg'} = \frac{1}{N} \sum_i b_{pig} b_{pig'}$$

$$= \sum_m \sum_{m'} w_{pmg} c_{pmm'gg'} w_{pm'g'}$$

Where:

$c_{pmm'gg'} = \frac{1}{N} \sum_i a_{mig} a_{m'ig'}$ = the covariance between all individual coefficients, a_{mig}, on the principal axes m in all groups g.

5. The variance of the composite score is found by

$$S_{p.}^2 = \sum_g \sum_{g'} c_{pgg'}$$

6. The variance of individual coefficients on transformed factors for group g is

$$S_{pg}^2 = c_{pgg} = \frac{1}{N} \sum_i b_{pig}^2$$

$$= \sum_m \sum_{m'} w_{pmg} c_{pmm'gg} w_{pm'g}$$

7. Coefficient alpha for the composite score, $b_{pi.}$, may be obtained, where the b_{pig} are considered to be items.

$$\alpha_p = \frac{n}{n-1} \left[1 - \frac{\sum_g S_{pg}^2}{S_{p.}^2} \right]$$

$$= \frac{n}{n-1} \left[1 - \frac{\sum_g c_{pgg}}{\sum_g \sum_{g'} c_{pgg'}} \right]$$

8. ϕ_p, the ratio whose maximum yields a maximum α_p, is

$$\phi_p = \frac{\sum_g \sum_{g'} c_{pgg'}}{\sum_g c_{pgg'}}$$

$$= \frac{\sum_g \sum_{g'} \sum_m \sum_{m'} w_{pmg} c_{pmm'gg'} w_{pm'g'}}{\sum_g \sum_m \sum_{m'} w_{pmg} c_{pmm'gg'} w_{pm'g}}$$

Appendix Q (Continued)

9. A maximum of ϕ_p is obtained by taking the partial derivative of ϕ_p with respect to w_{pmg},

$$\frac{\partial \phi_p}{\partial w_{pmg}} = \frac{(\sum_g \sum_{g'} \sum_m \sum_{m'} w_{pmg} c_{pmm'gg'} w_{pm'g'})(\sum_{g'} \sum_{m'} c_{pmm'gg'} w_{pm'g'}) - (\sum_g \sum_{g'} \sum_m \sum_{m'} w_{pmg} c_{pmm'gg'} w_{pm'g'})(\sum_{m'} c_{pmm'gg'} w_{pm'g'})}{(\sum_g \sum_{g'} \sum_m \sum_{m'} w_{pmg} c_{pmm'gg} w_{pm'g})^2}$$

and setting it equal to zero. The following equation for ϕ_p is obtained:

$$\sum_g \sum_{m'} c_{pmm'gg'} w_{pm'g'} = \phi_p \sum_{m'} c_{pmm'gg} w_{pm'g}$$

10. The general equation for all ϕ_p can be expressed in terms of matrix notation as follows:

$CW = \phi\, C^*W$

Where:

$$C = \begin{bmatrix} [c_{mm'11}] & [c_{mm'12}] & [c_{mm'13}] & [c_{mm'14}] \\ [c_{mm'21}] & [c_{mm'22}] & [c_{mm'23}] & [c_{mm'24}] \\ [c_{mm'31}] & [c_{mm'32}] & [c_{mm'33}] & [c_{mm'34}] \\ [c_{mm'41}] & [c_{mm'42}] & [c_{mm'43}] & [c_{mm'44}] \end{bmatrix}$$

= a 4r x 4r matrix containing covariances between all principal axes in all groups.

$$C^* = \begin{bmatrix} [c_{mm'11}] & 0 & 0 & 0 \\ 0 & [c_{mm'22}] & 0 & 0 \\ 0 & 0 & [c_{mm'33}] & 0 \\ 0 & 0 & 0 & [c_{mm'44}] \end{bmatrix}$$

= a 4r x 4r matrix containing covariances between the principal axes within each group for each group but containing zero elements elsewhere.

Appendix Q (Continued)

$W = [w_{pmg}]$ = the matrix containing the weights w_{pmg}.

$\phi = D[\phi_p]$ = a $kr \times kr$ diagonal matrix containing the ϕ_p.

11. Another way of expressing the general equation is

$(C - \phi C^*)W = 0$.

A solution is facilitated by a modification of the equation to place it in proper form for the characteristic value problem. Procedures for effecting the modification and for the solution of the desired matrices ϕ and W follow:

$T'(C - \phi C^*)TT^{-1}W = 0$

$(T'CT - \phi TC^*T)T^{-1}W = 0$

Derive T such that $T'C^*T = I$ (i.e., by factoring $C^* = T^{-1'}T^{-1}$)

12. The procedure used in the present analysis for obtaining T is given below. Any factor analysis which accomplishes the above factoring would have been acceptable.

Consider only the diagonal section of C*, that is, the matrices $[c_{mm'gg}]$. If considered in the form of the characteristic value problem, then

$[c_{mm'gg}] = V_g \beta_g V_g'$.

Define

$T_g^{-1'} = V_g \beta_g^{1/2}$, then

$T_g' = \beta_g^{-1/2} V_g'$, and

$T_g = V_g \beta_g^{-1/2}$.

Construct the $kr \times kr$ matrix T as follows:

Appendix Q (Continued)

$$T = \begin{bmatrix} [T_1] & 0 & 0 & 0 \\ 0 & [T_2] & 0 & 0 \\ 0 & 0 & [T_3) & 0 \\ 0 & 0 & 0 & [T_4] \end{bmatrix}$$

= a supersectional matrix with T_g's running down the principal diagonal sections with zero elements elsewhere.

13. Define two matrices

$V \equiv T^{-1}W$

$B \equiv T'CT$

Note: V_g was used to establish the matrix T. V will be used to symbolize the matrix of characteristic vectors for the matrix T'CT. Substituting these identities in the equation yields the following characteristic value problem which gives a solution for ϕ and V:

$(B - \phi I)V = 0$.

14. Having obtained V, the matrix W may be obtained.

$W = TV$

15. The computing formula for obtaining the coefficient alpha for the pth composite factor is given by the equation

$$\alpha_p = \frac{n}{n-1}\left[1 - \frac{1}{\phi_p}\right] \quad .$$

16. W*, a 4r x q submatrix, is formed by using the first q columns of W which correspond to the largest q roots in ϕ.

17. The q x 262 matrix of composite individual coefficients A_c is then obtained by the equation

$A_c = W^{*\prime}A^*$.

Appendix Q (Continued)

18. A 600 x 262 supersectional matrix, X, containing the matrices, X_f, of original ratings on Form A and on Form B of the Trail Similarity Rating Scale may be formed.

$$X = \begin{bmatrix} X_A \\ X_B \end{bmatrix}$$

19. A 600 x 262 supersectional matrix, $\hat{X}_q$, containing the matrices of approximations to the original ratings on Form A and Form B of the Trait Similarity Rating Scale by the q composite factors, $\hat{X}_{fg}$, may be defined.

$$\hat{X}_q = \begin{bmatrix} \hat{X}_{Aq} \\ \hat{X}_{Bq} \end{bmatrix}$$

20. The matrix A_c is related to $\hat{X}_q$ by the equation

$$\hat{X}_q = Y_c A_c \quad ,$$

where: Y_c is a 600 x q matrix of item coefficients on the q reliable composite factors. The matrix Y_c was not obtained in the present analysis.

21. The solutions for matrices A_c and Y_c are unique only within an orthogonal transformation, T_{12}.

$$\hat{X}_q = Z_c B_c = Y_c T_{12}'^{-1} T_{12}' A_c = Y_c A_c$$

where: $Z_c = Y_c T_{12}'^{-1}$ = the 600 x q matrix of item coefficients on the transformed, composite, principal axes.

$B_c = T_{12}' A_c$ = the q x 262 matrix of individual coefficients on the transformed, composite, principal axes.

Appendix Q (Continued)

22. Since Y_c was not obtained, the Z_c matrix was approximated from the X and B_c matrices using a pseudoinversion technique suggested by Dr. Ledyard R Tucker.

$$\hat{Z}_c = X B_c' (B_c B_c')^{-1}$$